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WEALTH, EXPENDITURE AND DECISION-MAKING FOR EDUCATION

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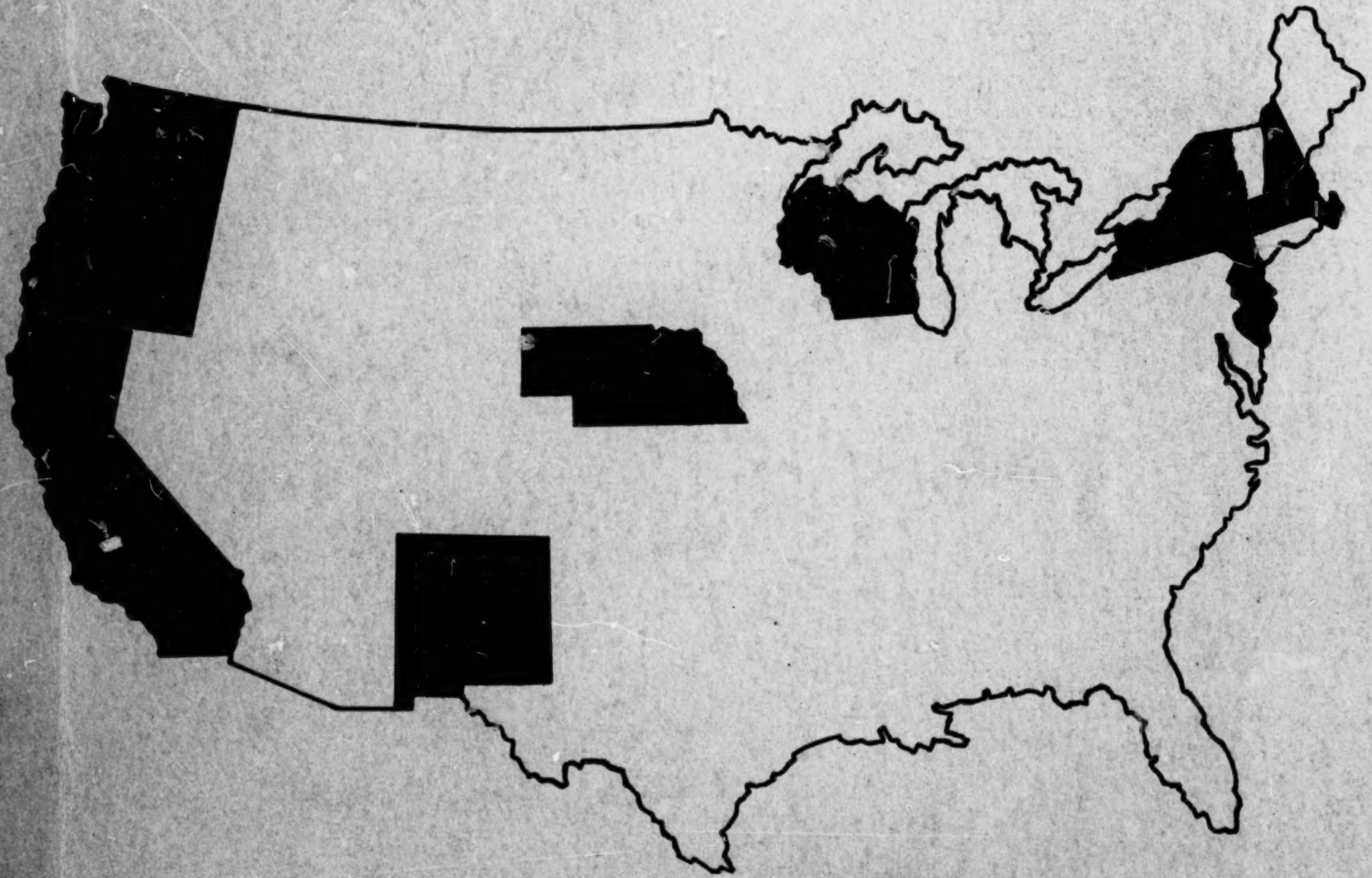

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WEALTH, EXPENDITURES AND DECISION-MAKING FOR EDUCATION

by

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PREFACE

This report is the second in a series of studies of the processes by which resources in the United States are allocated to the support of public education. It has three parts. In Part I, we formulate a rationale for the study of school finance, and apply it to explain variations in expenditures associated both with state efforts to equalize educational benefits and tax loads and with levels of state support. As will be seen, the rationale postulates three clusters of determinants for educational expenditures, which include factors of demand for educational services, factors of ability to realize the demands, and factors related to the system of voting by which demands can be expressed and abilities utilized. The analysis indicates the conditions under which state efforts toward equalization can be achieved, and the conditions under which increases in state revenues result in increased expenditures for education.

Part II reports some explorations of the interaction of wealth and expenditures for education, using three models developed from the general rationale. The first model examines the relationship of wealth to educational expenditures; the second the relationship of resource input to educational outcomes; and the third the relationship of educational outcomes to economic growth. The general conclusion of this section is that wealth invested in education has predictable effects on the development of human talent, and the development of talent in turn has predictable effects on economic growth and the generation of new wealth.

Part III presents an analysis of fiscal independence versus dependence in the relationships of local school districts to other governmental agencies. The analysis is directed toward developing a typology of these relationships. The analysis suggests that the fiscally dependent district can be expected to spend slightly less for education than the fiscally independent district, under similar conditions of ability and demand for education, but that the relationships are too complex to permit useful generalizations that will hold for interstate study.

* * * * *

Once more we find ourselves indebted to the many people whose assistance was acknowledged in the previous report, School Revenue Systems in Five States,[1] and who have continued to contribute suggestions, criticism, and insights into the problems under study.

In addition to the financial support provided by the Cooperative Research Branch, many members of the United States Office of Education provided valuable encouragement and assistance, including Wayne O. Reed, Deputy Commissioner; Fred F. Beach, Director, Administration of State and Local School Systems; Clayton D. Hutchins, Chief, School Finance; Albert R. Munse and Eugene P. McLoone, Specialists in School Finance; and William R. Carriker and Alice Y. Scates of the Cooperative Research Branch.

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[1] H. Thomas James, School Revenue Systems in Five States (Stanford University, 1961).

A special debt of gratitude is acknowledged to the National Advisory Committee for the study. In addition to those members of the Advisory Committee for the previous study who continued to serve - Arvid J. Burke, Director of Studies, New York Teachers Association; R. L. Johns, Head, Educational Administration, University of Florida; Erick L. Lindman, Professor of Education, University of California at Los Angeles; and Edgar L. Morphet, Professor of Education, University of California at Berkeley - the new committee included W. Monfort Barr, Professor of Education, Indiana University; Charles S. Benson, Lecturer, School of Education, Harvard University; Jesse Burkhead, Professor of Economics, Syracuse University; Roald F. Campbell, Director of the Midwest Administration Center, University of Chicago; John Guy Fowlkes, Professor of Education, University of Wisconsin; Werner Z. Hirsch, Professor of Economics, Washington University; and Leon Minear, Superintendent of Public Instruction, Oregon. This committee met on the Stanford campus in the summer of 1961, and its members were generous in their contributions both at that preliminary meeting and throughout the period of the study.

The support and interest of the Chief State School Officers, acknowledged in the earlier study, is again noted with appreciation, and our thanks go to Leon Minear of Oregon, who also served on the Advisory Committee, James E. Allen, Jr., of New York, Owen B. Kiernan of Massachusetts, Charles F. Ritch of New Hampshire, and Tom Wiley of New Mexico, for the unfailing courtesy and cooperation extended both by these executives and by their professional and clerical staffs. Edgar Fuller, Executive Secretary of the Council of Chief State School

Officers, has been an unfailing source of encouragement and support.

The advice and assistance of faculty members at Stanford University has been acknowledged in the previous report; in addition, John G. Gurley of the Department of Economics, and Richard O. Atkinson, Associate Professor of Education and Psychology, were especially helpful in their advising of advanced graduate students engaged in parts of this study.

A study of this kind must be evaluated on its substantive contributions to our knowledge about the processes it examines, but it also has a valuable by-product in the men it helps develop through advanced graduate study. J. Alan Thomas, assistant director of this study, and Harold J. Dyck, research associate, completed their work for the Ph.D. degree and left the project in the fall of 1962 to assume their duties as assistant professors of educational administration, Thomas at the University of Chicago, and Dyck at the University of California, Berkeley. Gordon L. Chamberlin left in the winter of 1962 to become business manager of the Cupertino (California) Elementary School District. J. Duane Falk and Nels W. Hanson will complete work for doctorates in the summer of 1963, and Marvin C. Alkin and Richard B. Clifford, who joined the staff in 1962, are embarked on a program of study that will lead to special competencies in the field of school finance. The substantive contributions of these members of the project staff are gratefully acknowledged, as are those of Harl E. Ryder, Jr., an advanced graduate student in economics whose especially valued skills contributed to the analyses of the determinants of expenditures; and Mrs. Nora Gross, who assisted in the analysis of the state school finance systems.

The special assistance of John C. Flanagan, Director of Project Talent, and John T. Dailey, Program Director, of the University of Pittsburgh Project Talent Office, who shared Project Talent data and processed it for us in connection with Thomas's analysis is gratefully acknowledged.

Finally I wish to thank Katheryne Penfield, who has served continuously through both studies as my secretary and administrative assistant, and Ruth Eagan and Helen Bernier, who were her faithful assistants, and provided the essential clerical services required by the project.

After assessing the foregoing contributions, the director alone is responsible for the contents of this report.

H. Thomas James
Director

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PART I

Effects of State Support on Equalization, Local Initiative, and Levels of Expenditures

CHAPTER ONE

A GENERAL RATIONALE FOR THE STUDY OF SCHOOL FINANCE

In studies over the past several years, we have sought to develop a general rationale for the study of school finance. Such a rationale, if it can be satisfactorily formulated, should provide not only a basis for describing and explaining school finance phenomena, but also a basis for predicting the behavior of communities in financing public education. We suggested in the previous study that the formulation of such a rationale must begin with the assumption that our resources will never be adequate to satisfy all the demands that can be made on them, and that the demands for public school funds are always resolved in competitive situations.

Granting this, we may postulate that three conditions are essential to public school support in our kind of market-oriented society. The first condition is a shared set of expectations for educational services sufficiently pervasive to generate group efforts in support of their achievement. The second condition is the availability of wealth from which funds can be allocated. The third condition is a political system that allows the expression of expectations, and access to the wealth.

These three conditions can be reformulated as clusters of determinants of educational expenditures in the public sphere, and each cluster in turn can be expanded and analyzed along the lines discussed in this chapter.

Expectations and the concept of demand

The first condition, expectations for educational services, has been analyzed by Downey[1] into 16 classes of curricular areas; and these in turn were expanded by Carter[2] to 42 classes, half of them designated as task areas and the other half as curricular and service areas. Studies such as these can provide scalable dimensions of educational expectations, which are useful for predicting school expenditure behavior if resources and governmental arrangements are held constant. Furthermore, the values of members of social groups, which shape expectations, can be studied.

Less objective analyses of community values and expectations for education are the basis for the policies formulated by boards of education; and such policies condition the operational decisions of practicing school administrators. This type of analysis is the principal function of school boards in our society. In delegating authority to local boards of education, state legislatures seek to make the schools responsive to school-board assessments of community expectations; but at the same time the local authority operates in a very complicated interplay between state and local preferences and costs, and usually is limited by policy formulated at the state level, which is based on the expectations in the larger society. Thus state funds may be used to increase services or to reduce local taxes within limits set by the state. The local boards are encouraged to determine the "mix" of local educational services, but certain minimum services in specified areas often are required by state law. Local boards may select teachers, but the state specifies minimum standards for those from among whom the choice can be made. Local boards may choose to suspend the operation of schools because children are being educated in private schools, but in many states the law requires such districts to be dissolved and the territory to be attached to an operating district for tax purposes; and even if the district is left intact, the board will be required to arrange for payment of tuition of any child in the district who may desire to attend another public school.

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[1] Lawrence W. Downey, The Task of Public Education (Chicago: Midwest Administration Center, The University of Chicago, 1960).

[2] Richard F. Carter, Voters and Their Schools (Stanford University, 1960).

Finally, expectations for educational services can be conceptualized as demand, in the economic sense. The analytical tools developed by economists for the study of demand can be brought to bear with profit on this phenomenon. The number of pupils to be educated is, of course, a principal factor in demand. A qualitative aspect of demand is reflected in pupil-teacher ratios, which is a vital mediating variable in determining school costs. In our work we have found certain items of census data to be useful, though imperfect, indicators of demand: the percent of housing that is owner-occupied, the median years of schooling of the adult population, the percent of population that is unemployed, the percent of population that is non-white, the percent of population on farms, and the percent of school population in non-tax-supported schools.

The implication drawn from the foregoing material is that the concept of demand, though complex, can be subjected to analysis, and that the analyses may be profitable.

Wealth and the concept of ability

When our second condition, the availability of resources that can be allocated to meet the demands, is restated as a set of determinants, it equates with the concept of ability to pay. As such, it has been generally accorded the most important role in determining the level of educational expenditures, and has received extensive attention in studies of school finance. For instance, Renshaw,[3] in a regression analysis of state expenditure data, reported a simple correlation of per capita income with educational expenditures among the states, accounting for about 78 percent of the variance in expenditures.

These and other similar conclusions from U.S. data, together with support from the international scene reported by Svennilson, Edding, and Elvin,[4] seem to offer ample justification for designating per capita income as an important determinant of educational expenditures. However, it should be noted that in selecting the indicator of wealth for state and national comparisons, investigators are drawn not to the valuation statistic so widely used in state school-revenues systems, but to the personal income statistic, which, as we noted in our previous study, is not necessarily functionally related. Furthermore, both the income and the valuation statistics are complex, reflecting some very intricate interactions between human beings and their environment under varying systems of social values and "rules of the game." If these statistics are to be useful, our search for understanding must encompass a continuing extension of our knowledge about the determinants of both income and property values.

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[3] Edward F. Renshaw, "A Note on the Expenditure Effect of State Aid to Education," The Journal of Political Economy (April 1960).

[4] Ingvar Svennilson, Frederich Edding, and Lionel Elvin, "Targets for Education in Europe in 1970," a paper prepared for the Policy Conference on Economic Growth and Investment in Education, sponsored by the Organization for European Economic Cooperation, in Washington, October 16-20, 1961.

Most of the state provisions for financing the public schools include some measure of the taxpaying ability of local school districts, in order to ensure an equitable distribution of state funds. Since local school revenues are drawn primarily from property taxes, the valuation of taxable property per pupil has been the most widely used measure of taxpaying ability. Where values of property were set by local assessors, however, the advantage of understating values - and thus improving the district's relative position in claiming state funds - often led to competitive underassessment. Consequently, a trend is evident toward establishing state supervision of assessment practices, and shifting the measure of taxpaying ability from the assessed value to an equalized value determined by a state tax authority. A count made in April, 1962, revealed 23 states using equalized valuations in determining local districts' shares of equalizing funds, and 11 other states supervising local assessment practices with a greater or lesser degree of effectiveness.

The measure of ability widely used for interstate and international comparisons is personal income per capita. The argument advanced in support of this measure is that taxes usually are paid out of current income, and therefore income is a more realistic indicator of the ability to pay taxes than is the amount of property owned. However, this measure is difficult to apply within states because income data are rarely available at the school-district level, and therefore no state system for financing public schools uses it.

A measure of ability used in seven states combines several economic indicators, such as retail sales, to produce an index of taxpaying ability. The purpose of these indices, according to R. L. Johns, who has assisted in the development of most of those now in use, is to develop the best estimate of equalized valuations, and they are therefore used only where sound state estimates of local property values are not otherwise available.

Several investigators have noted that districts would probably be ordered quite differently if per capita income rather than per capita valuation were the standard, but little attention has been given to these differences in the school finance literature of recent years. The explanation for this lack of attention to what appears to be an interesting and important question probably lies in the difficulty of bringing the two scales together for the comparative purposes; income data, as we have noted, is readily available for comparisons among states but difficult to break down to the district level; and property values, which can be made comparable for interdistrict comparisons, are difficult to adjust for valid interstate comparisons.

An earlier study[5/] used correction factors supplied by state tax authorities to generate from assessed values some crude estimates of

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[5/] H. Thomas James, "A Unified Concept of State School Finance Systems," unpublished Ph.D. dissertation (University of Chicago, 1958).

the full market value of taxable property for each state. A simple rank-order correlation of .66 was found between mean assessed valuations per school-age child and the estimated full value per child. The correlation between assessed value per child and personal income payments per child was .63. When assessed values of property were adjusted to full value, however, the correlation between property and income dropped to .44.

Within the limitations set by the admittedly crude estimates of full values of property, the probable crudity of the income estimates, and the possibility that income may not be uniformly available for payment of property taxes, these findings suggest that assessed values, state equalized values, and per capita income represent quite different dimensions of the concept of taxpaying ability. Local assessors may take into account (at least subjectively) income data in assessing property, thus "tempering the wind to the shorn lamb" and producing an order of assessments more nearly related to ability as measured by income than is produced by the more objective state methods for equalizing assessments.

In the course of this study we obtained further evidence that income and property measures probably indicate quite different dimensions of taxpaying ability. With the assistance of state tax authorities, we obtained estimates of the full market value of selected school districts. Since we could not obtain per capita income data by school districts, we used median family income, and derived simple correlations ranging from .57 in Wisconsin, .40 in New York, .38 in Oregon, .34 in California, .30 in Massachusetts,

.26 in New Jersey to .09 in New Mexico, .01 in Washington and -.18 in Nebraska. These findings supported the earlier observation of differences in the scales, but the findings were inconclusive because of known limitations in the estimates of the full value of taxable property, and the unknown limitations imposed by using median family income data as a proxy for per capita personal income payments.

We decided to seek more direct evidence of these differences in the data of California counties. Our reasons were threefold. Personal income data in California are available by counties; the state tax authority provides a correction factor for adjusting the assessed values determined by each county's assessor to the state average ratio of assessed value to full market value; and school district data can be readily grouped by counties. Davis[6] found a rank-order coefficient of correlation between per capita equalized valuation of taxable property and per capita personal income payments of .22; he noted rural-urban differences, and after regrouping his data he found the correlation rose to .38 in the 41 rural counties and dropped to .14 in the 17 urban counties.

Davis developed a discrepancy scale by ordering the counties according to valuation and found considerable difference between these two orderings of the counties. He further analyzed the counties on the extremes of the discrepancy scale and found a pattern of high income and low valuation per capita to be present in rapidly growing, heavily populated urban counties. When their school expenditures were examined in relation to property values (the criteria applied to determine equalization aid in California), these counties appeared to be making twice the tax effort of the districts at the other end of the discrepancy scale; but when school costs were examined in relation to personal income, they appeared to exert only half the effort of the counties having high valuations and low income.

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[6] Donald L. Davis, "Taxpaying Ability: A Study of the Relationship Between Wealth and Income in California Counties," unpublished Ed.D. dissertation (Stanford University, 1963).

The high-valuation, low-income counties were rural, sparsely populated, and relatively stable. Davis concluded that the evidence of great differences in the ordering of counties on these two scales is clear; he noted that his study probably underestimates the differences, because county totals in many instances probably mask individual district differences of even greater magnitude. The traditional foundation program, with the local contribution determined by a uniform tax rate, may give less equitable treatment to the high-value, low-income district, and favor the high-income, low-value district.

These and other studies of the ability dimension suggest the need for continued efforts to analyze the complex components of ability to pay taxes.

Structure and the concept of decision-making

Our third condition is the existence of a system for voting that allows the expression of preferences, and access to the resources necessary for their realization. The representativeness of legislative bodies is a relevant concern in this concept. Baker[7] examined rural versus urban political power within the states; he compared percentages of the states' population in urban areas to the percentages within each house in the legislature elected by these urban areas. More recently Dauer and Kelsay[8] examined the same problem from a slightly different perspective by determining the minimum percentages of population needed to elect a majority in each house of the legislature. While almost a majority of the people are required to elect an upper house in Massachusetts or Wisconsin, as few as 9.59 percent of the people could elect a majority of the lower house in Connecticut, and as few as 5.96 percent of the people could elect a majority of the upper house in Georgia. In 1961 David and Eisenberg[9] reported on an index of representativeness, which was obtained by adding the minimum population percentage that can elect a majority of each house, thus giving equal weight to each house and yielding an index on a scale of 100. They extended their analysis to cover four decades, and analyzed representativeness within states by counties categorized by size. Then in

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[7] Gordon E. Baker, Rural Versus Urban Political Power, Short Studies in Political Science, No. 20. (New York: Doubleday 1955).

[8] Manning J. Dauer and Robert G. Kelsay, "Unrepresentative States," National Municipal Review (Vol. 44, December 1955), pp. 571-75, 587, (as corrected in Vol. 45, April 1956).

[9] Paul T. David and Ralph Eisenberg, Devaluation of the Urban and Suburban Vote (Bureau of Public Administration, University of Virginia, 1961).

1962 a Tennessee reapportionment case[10] reached the U. S. Supreme Court. In a historic decision the Court established a precedent that will doubtless lead to sweeping reforms in representation throughout the nation, and gave new impetus and importance to studies of representativeness.

At the local level studies of fiscal independence versus dependence of school districts have interested educational and political scientists. Though we found little basis for generalizing about this structural characteristic across the state lines, we found some evidence that these alternative arrangements do have consistent and significant effects on expenditures within some states. Studies of the allocation of taxing power are relevant, however, involving such phenomena as rate limitation, budget or expenditure limitations, and assignment of tax bases in relation to other than school use of those bases.

The central concept in this area is decision-making, and analytical tools are being developed in many fields, notably in political science, in the economics of public finance, and in psychology. In this phase of our work we are concerned primarily with the structural arrangements that surround decision-making, and with evidences of whether these conditions facilitate or constrain the process.

Other factors

Finally, the rationale and any models derived from it need to take into account variations in expenditures not attributable to the postulated determinants of expenditures. Such variations can be reduced or removed from the dependent variable by detailed study and the refinement of expenditure data. It is necessary to know, for instance, how uniform are the accounting processes among school districts, and to make appropriate adjustments in line items in expenditures when they are not uniform, in order to produce comparable expenditure totals. When per pupil expenditures are used, it is necessary to study the various procedures for counting attendance, and to make appropriate adjustments for them. Thus, junior college students are counted in some districts and not in others, postgraduate, adult, and vocational-school pupils may or may not be included; and the arithmetic processes for determining the pupil unit vary in different jurisdictions. Even after these adjustments are made, expenditures probably should be further adjusted to remove wide differences in the cost of living.

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[10] Charles W. Baker, *et al*. v. Joe C. Carr, *et al*. 82S. Ct. 691 (1962).

An extension of the rationale

In this study we have sought to extend the foregoing rationale. The next logical step appeared to be to treat expenditures and certain other factors as input, and attempt to relate them to output. Our efforts in this direction are reported in Part II, together with a preliminary effort toward demonstrating the upward spiral of effects from educational expenditures to educational output to increases in wealth and increases in the demand for education, which in turn raise educational services to new levels.

Chapter Two, in addition to reporting an extension of tests for equality and initiative developed in the previous study, presents a preliminary analysis based on the rationale to explain residual variations in expenditures after factors of demand and factors of ability are removed.

CHAPTER TWO

EXTENSION OF THE TESTS FOR EQUALITY AND INITIATIVE

The tests for equality and initiative which were previously applied to five states,[1] have been extended to five more states; this chapter reports on the new data and provides an analysis of expenditure behavior under varying conditions of state support. These tests were based on the assumption that state finance systems are purposive, that governments devise school support systems in order to equalize the distribution of financial support for education, and the resulting tax levies, among school districts, and to stimulate local initiative. We proposed tests for equality in the distribution of local tax payments supporting education and in the distribution of educational services. The tests used were measures of dispersion applied in the first instance to school tax rates for current operation levied on the equalized valuation of property, and in the second instance to current expenditures not mandated by the state as a measure of the initiative exercised locally.

Selection of states

In selecting the second group of five states, we adhered as closely as possible to the criteria that governed the selection of the first group. These criteria were as follows:

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[1] See H. Thomas James, School Revenue Systems in Five States (Stanford University, 1961).

1. A broad distribution in levels of state support. Using 1957-58 data on revenue per pupil from state sources,[2] we computed the standard deviation of amount of aid per pupil by state. States were selected on the following basis: one state at or near the mean, two approximately a standard deviation above and below the mean, and two approximately two standard deviations above and below the mean, as shown in Table 1:

Table 1

State revenue per pupil at selected intervals on a national scale, 1957-58

Standard Deviation from the Mean	Amount of State Revenue per Pupil
+2	$ 290
+1	218
0	146
-1	74
-2	2

2. States with reasonably effective programs for equalizing assessments. To facilitate the application of this criterion, some small tolerance from the designated sigma points was allowed.

3. States near or above the median income per capita.

4. States varying little in rank on ability as compared with rank on expenditure. We avoided states with wide variations, since inspection of these ranks suggested that the measure of expenditure per pupil may be most distorted in instances of extreme variance, owing primarily to the effect of sparsity factors.

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[2] NEA Research Report 1959, Rankings of the States (Washington: National Education Association, April 1959), Table 38.

5. States with local district systems. Reorganization of school districts toward a single district is also a factor in equalization, and it was felt desirable to exclude this factor as much as possible by dealing only with states having the larger numbers of local districts.

6. When application of the other five criteria still left a choice within half a standard deviation from the point selected, the state was selected with which the chief researcher had had some experience, or that would require the least amount of travel.

The states selected by these criteria were New Hampshire, Massachusetts, Oregon, New York, and New Mexico; they are shown in Table 2, paired with the state from the previous study that is most nearly like them. The table also shows state revenues as a percentage of total school revenues.

Table 2

Revenue from state sources, 1957-58, in selected states[a]

State	Revenue From State Per Pupil Enrolled		Revenue from State Sources as Percent of Total Revenue	Cluster Average
	Amount	Rank in Nation		
Nebraska	$ 18	50	6.9	8.3
New Hampshire	33	49	9.6	
Massachusetts	80	43	26.9	24.2
Wisconsin	83	41	21.4	
New Jersey	118	27	26.4	27.9
Oregon	128	23	29.3	
California	207	8	39.1	39.4
New York	209	7	39.6	
New Mexico	254	4	77.2	63.7
Washington	289	3	50.2	

[a] NEA, *Rankings of the States*, 1960, Table 30.

Selection of districts

We retained the arbitrary minimum size of 1,500 pupils for districts to be studied, in order to limit further the effects of sparsity and inefficiency on variations in expenditures and in levy rates. We also limited our attention to districts providing at least 12 grades of education. (The number of districts studied in each of the ten states can be found in Table 3, page 18.)

The tests

The mean level of state support in each state was examined in relation to variations in property tax rates for current expense for education, and to variations in current expense per pupil.

We also looked for relationships between levels of state support and evidences of local initiative in supporting schools. Levy rates were reduced by the amounts mandated by the state to obtain a net voluntary levy; expenditures were reduced by all revenues not determined in the district, including the mandated levy; and the resulting rates and expenditures were examined for evidence that higher levels of state support are associated with lower voluntary rates and lower voluntary expenditures per pupil. This was essentially a test for the substitution effect of state support on local levies and expenditures.

The data

The tests made necessary some refinement of the available raw data. Current expense of education for each district, obtained from the publications or records of state departments of education, was reduced by all revenue receipts except those obtained from the district levy. This net cost to the district was divided by the equalized valuation of taxable property as reported by state departments of education or taxation, or as developed from assessed valuation by applying correction factors furnished by these agencies, to produce the levy rate required for the first test. Current expense was divided by average daily attendance to produce expenditures per pupil. To determine the voluntary levy rate, we subtracted from the rate required for current operation the state-mandated property tax rate, and to determine the voluntary expenditures, we reduced current expense by all revenue receipts applicable to current expense except that portion of the district levy not mandated by the state.[3]

Variation in rates

The mean rates, mean expenditures, and their deviations were then computed. Because the means varied considerably from state to state, and because we were interested in testing relative variation, a coefficient of variation (V) was computed.[4] These data are shown in Table 3.[5]

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[3] The data from which these measures were derived are presented in Appendix A. For more detailed discussion of these terms and how they were derived, see School Revenue Systems in Five States, Chapter 2 Appendix A.

[4] $V = \frac{\sigma}{M} \times 100$. Frederick C. Mills, Statistical Methods (New York: Henry Holt, 1955), pp. 129-30.

[5] Because of the nature of the data, the states are listed in all tables in this chapter according to the amount of revenue per pupil from state sources, beginning with the lowest state and ending with the highest.

Table 3

Number of selected districts, means, standard deviations, and coefficients of variation of required levy rates for current expense of schools in selected states, 1958-59.

State	Number of Selected Districts[a]	Mean Required Levy Rate (in mills)	Standard Deviation	Coefficient of Variation	Cluster Average
Nebraska	18	8.8	1.6	18	15.0
New Hampshire	12	12.5	1.5	12	
Massachusetts	124	11.9	2.7	23	20.5
Wisconsin	46	9.7	1.7	18	
New Jersey	121	11.4	2.8	25	25.0
Oregon	36	12.5	3.1	25	
California	59	5.6	1.1	20	32.5
New York	256	9.9	4.4	45	
New Mexico	28	.6	.8	129	93.5
Washington	72	3.3	1.9	58	

[a] The figures remain the same for Tables 3-7, and will not be repeated.

As reported previously, an irregular decline in rates occurs as state support rises. However, we again find no consistent reduction in variability in rates within states as we move up the scale of state support. On the contrary, the coefficients of variation run generally against the hypothesized pattern, indicating that relative variation increases with state aid. However, where the standard deviations approach or exceed the mean, the mean is so small as to make the variations inconsequential in their impact on taxpayers. Doubtless, state policy is less concerned with these variations as the magnitude of the levy declines.

We noted in the previous report a number of possible explanations for these results. For instance, variations in shared aspirations of communities may run counter to variations in taxpaying ability as we measured them. Also, we measured tax rates on equalized valuations, whereas several states based their "equalizing" payments on valuations assigned by local assessors, which may bear little relationship to equalized value. Charts 1 through 10 show the variable relationships between state aid per pupil and equalized valuation per pupil. We also noted in Chapter One that equalized valuations, though perhaps the most accurage indicators of taxpaying ability we have at present, are nevertheless not accurate predictors of current income; correlations between per capita property valuations and income are rather generally low.

Although the variations do not decline, we note a fairly general reduction in required levy rates as the level of state support rises. This reduction is consistent with our expectations, noted in the previous report, that a major part of increased state support substitutes for local levies; in fact, substantial evidence is available that legislative policy frequently intends to produce this substitution effect by using income or sales taxes to reduce property taxes. Where substitution is encouraged most explicitly through legislative policy, the policy is enforced by restrictive limitations on local levies, as in New Mexico and Washington. These restrictions have important effects in some instances, inhibiting both local levies and expenditures, as will be discussed below. On the other hand, where legislative policy rests substantial parts of the minimum educational program on the property tax, mandated levies are used to reduce the substitution

Chart 1

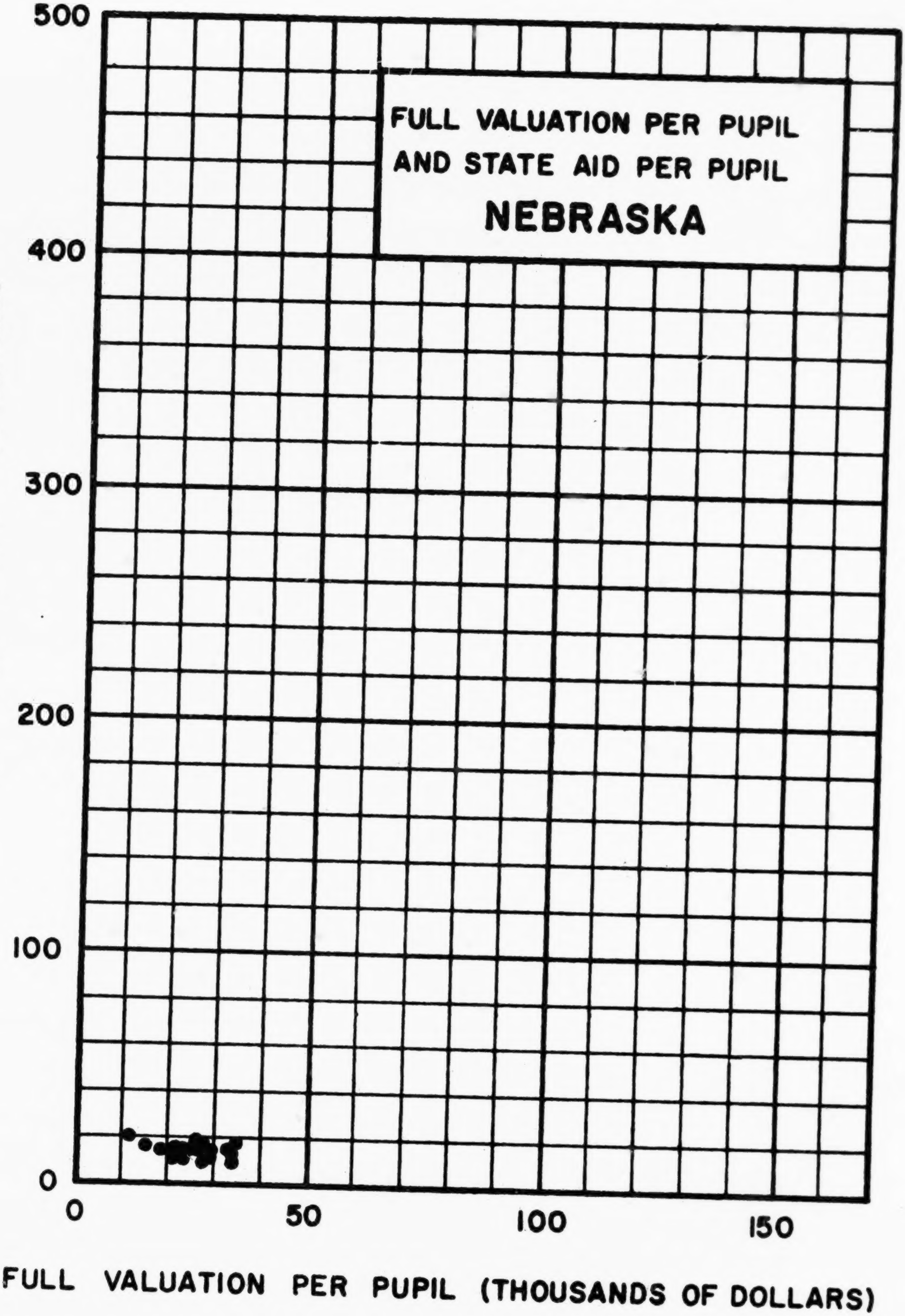

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
NEBRASKA
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 2

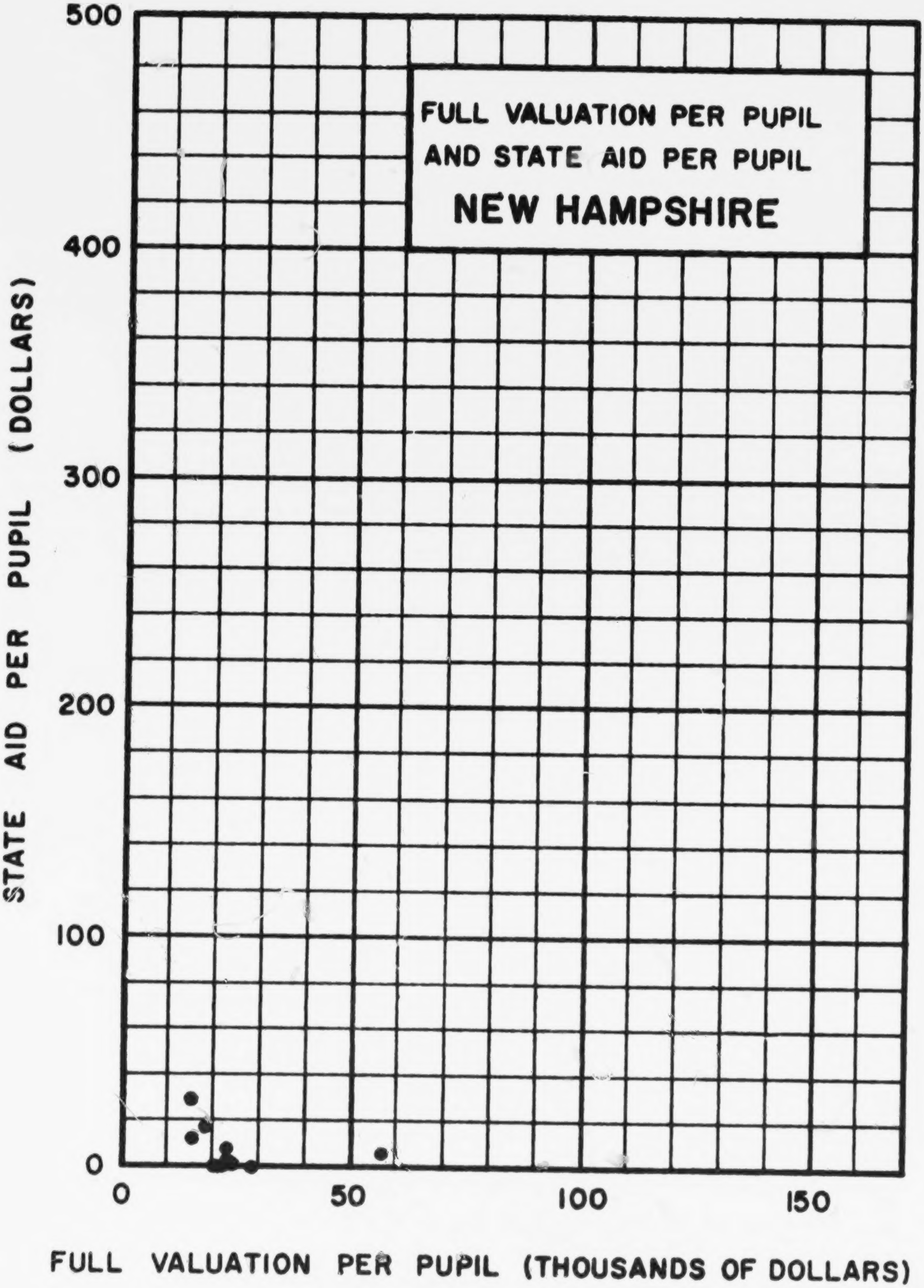

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
NEW HAMPSHIRE
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 3

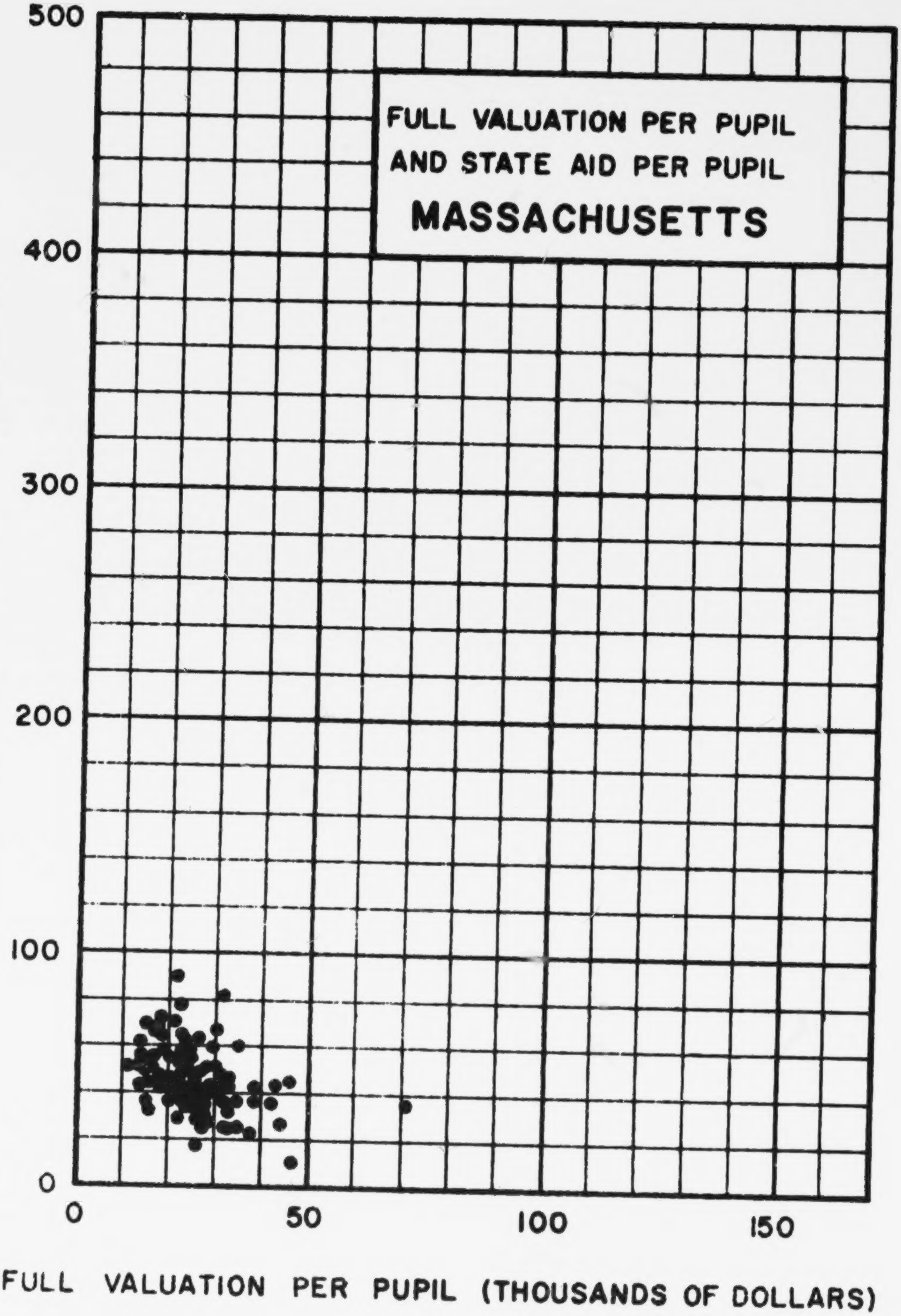

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
MASSACHUSETTS
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 4

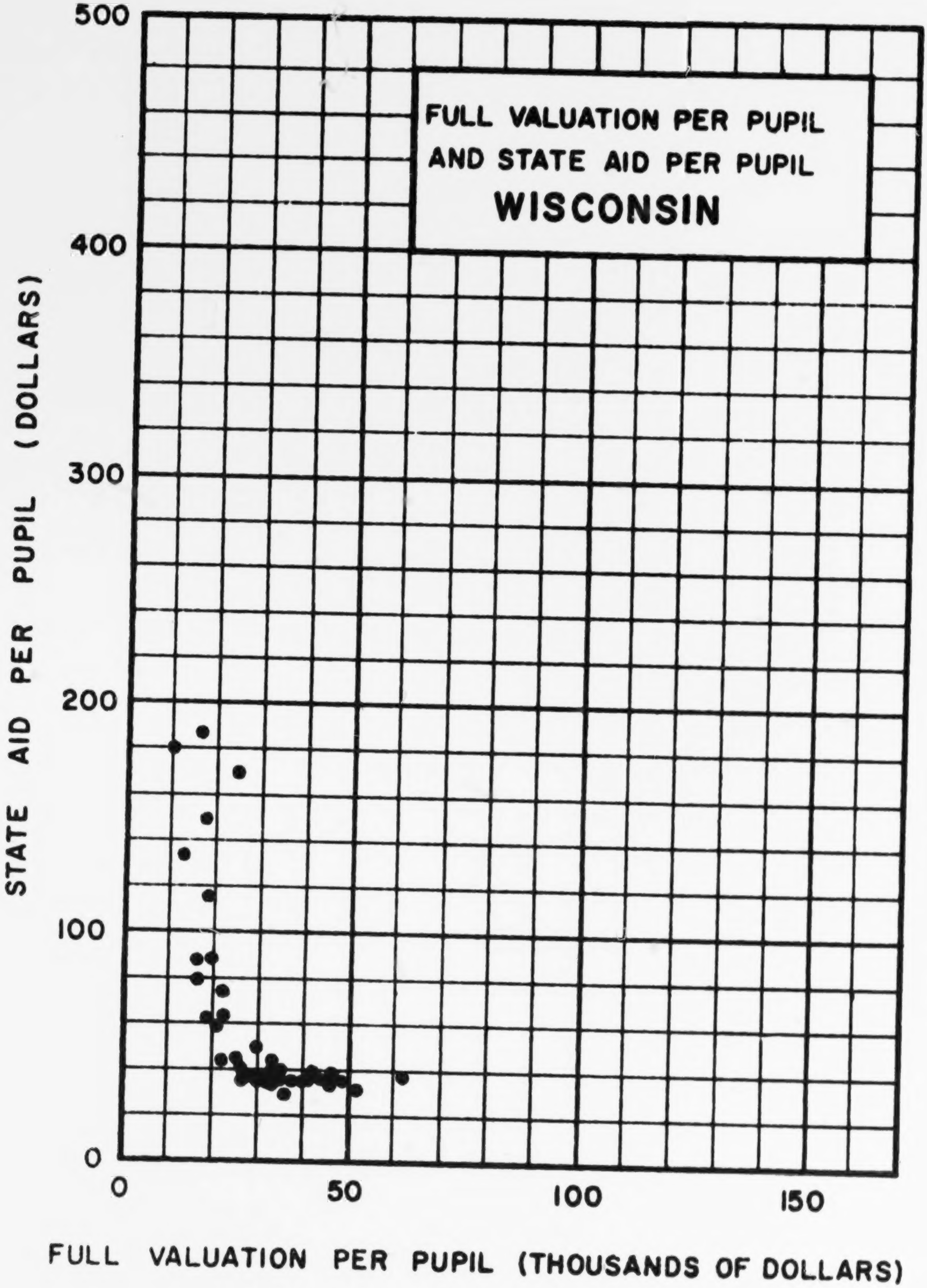

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
WISCONSIN
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 5

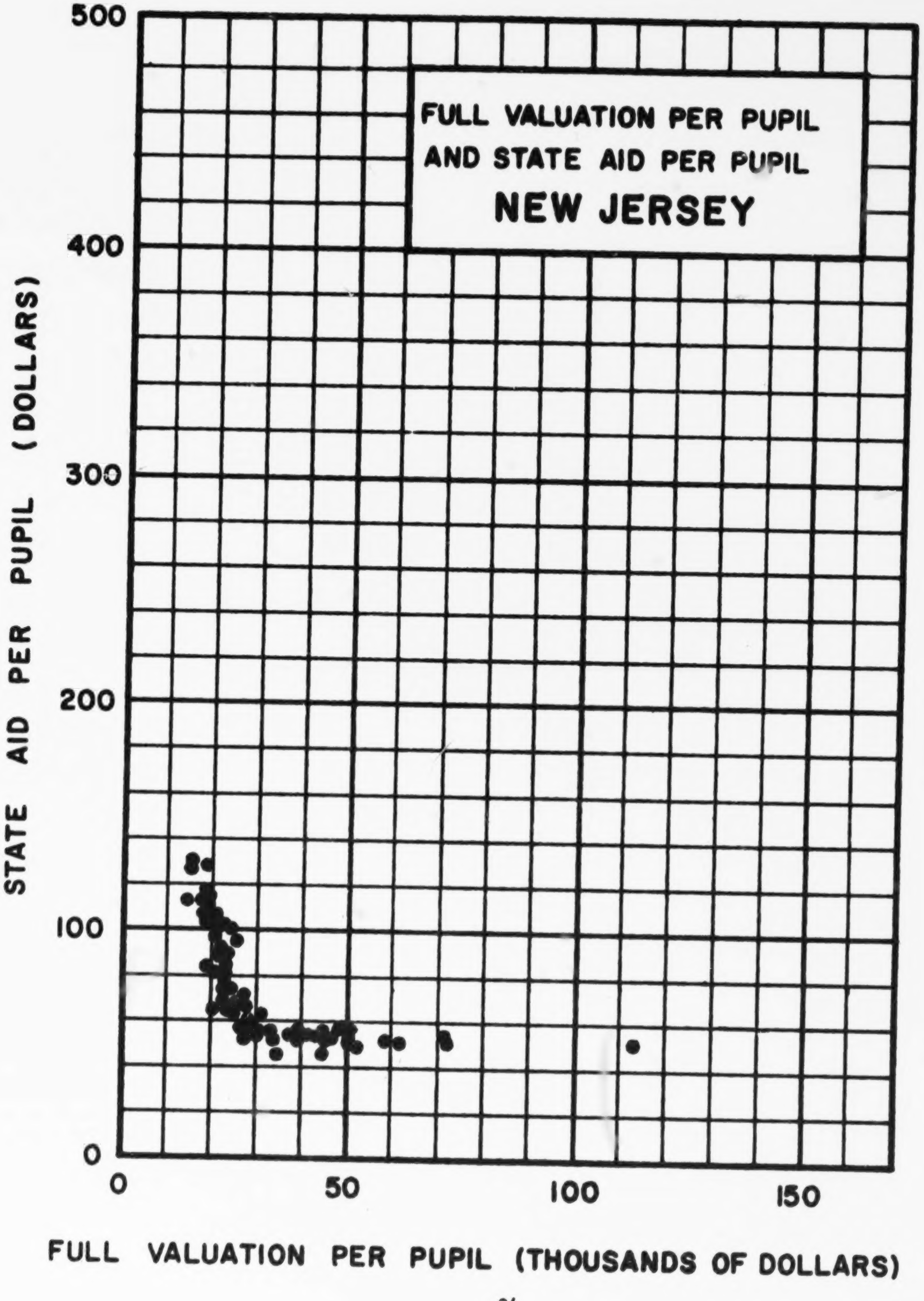

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
NEW JERSEY
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 6

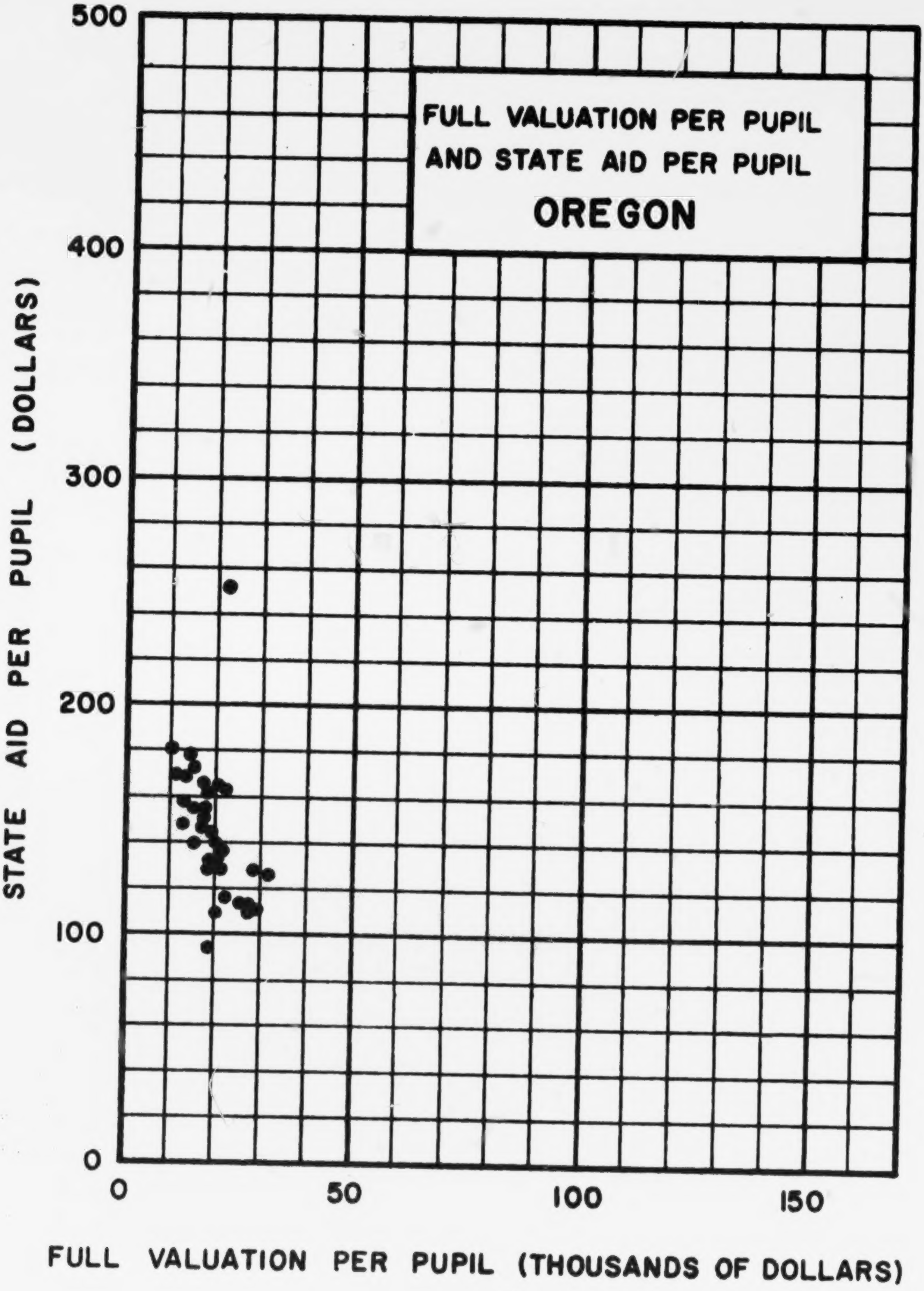

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
OREGON
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 7

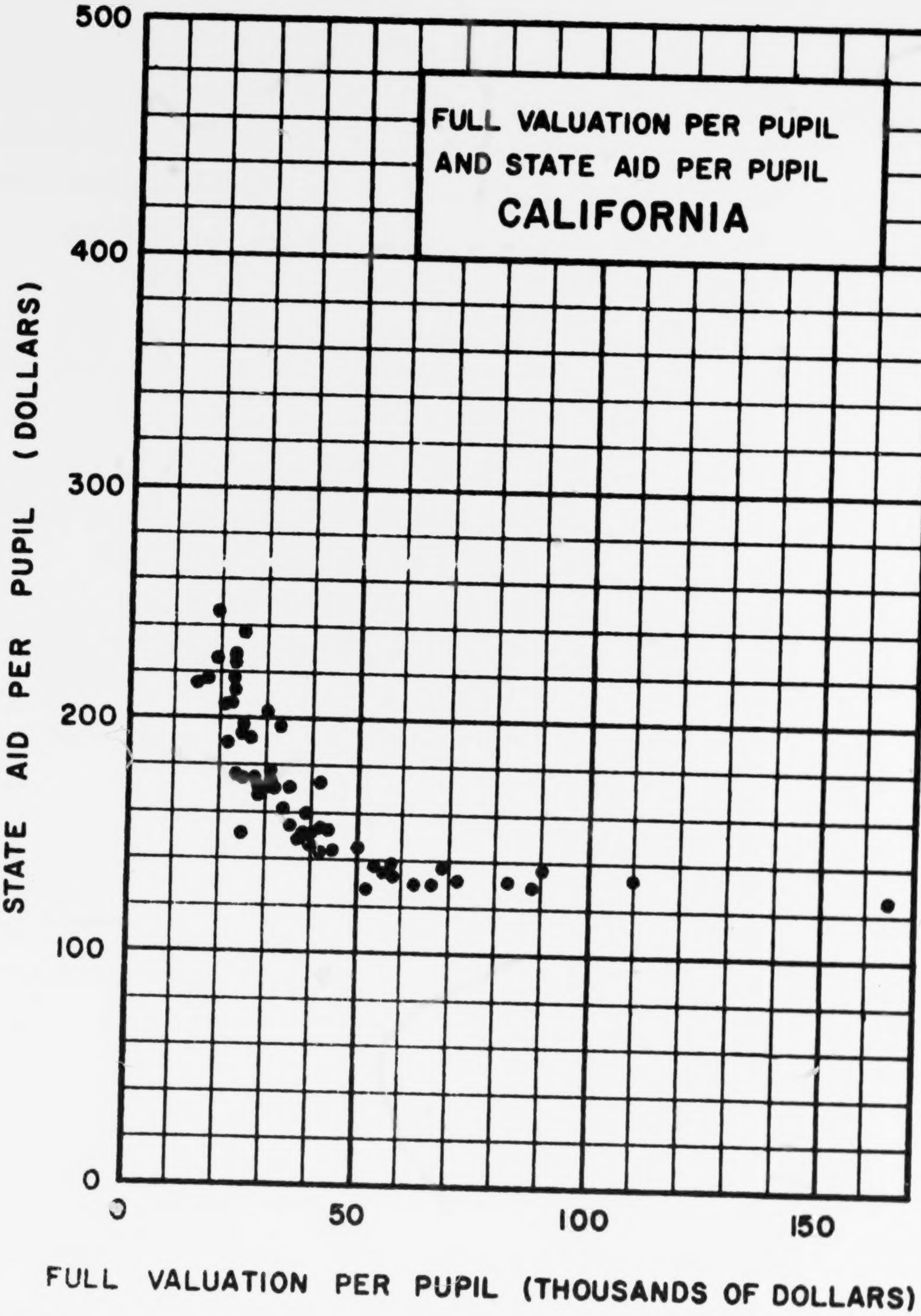

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
CALIFORNIA
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 8

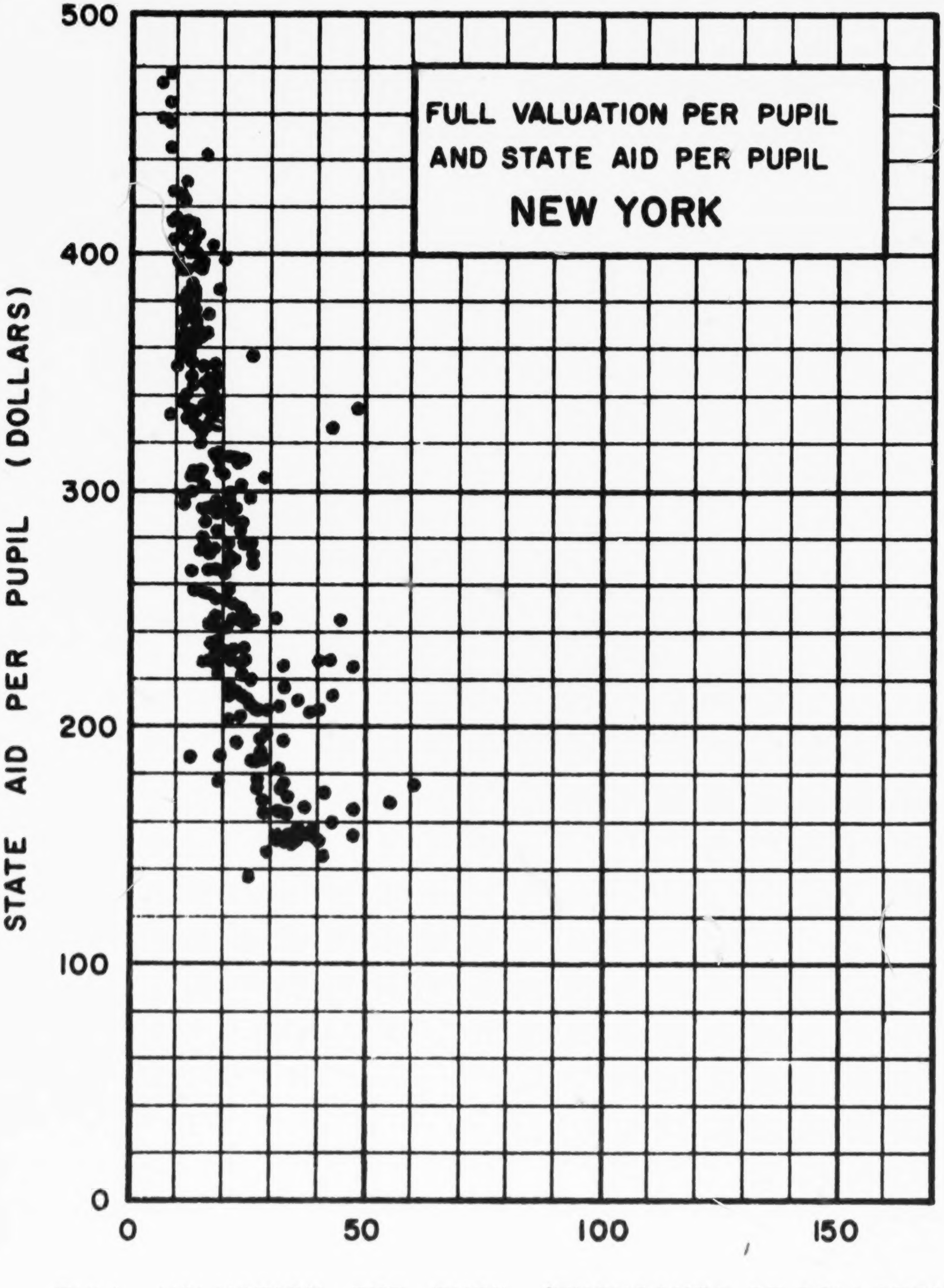

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
NEW YORK
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 9

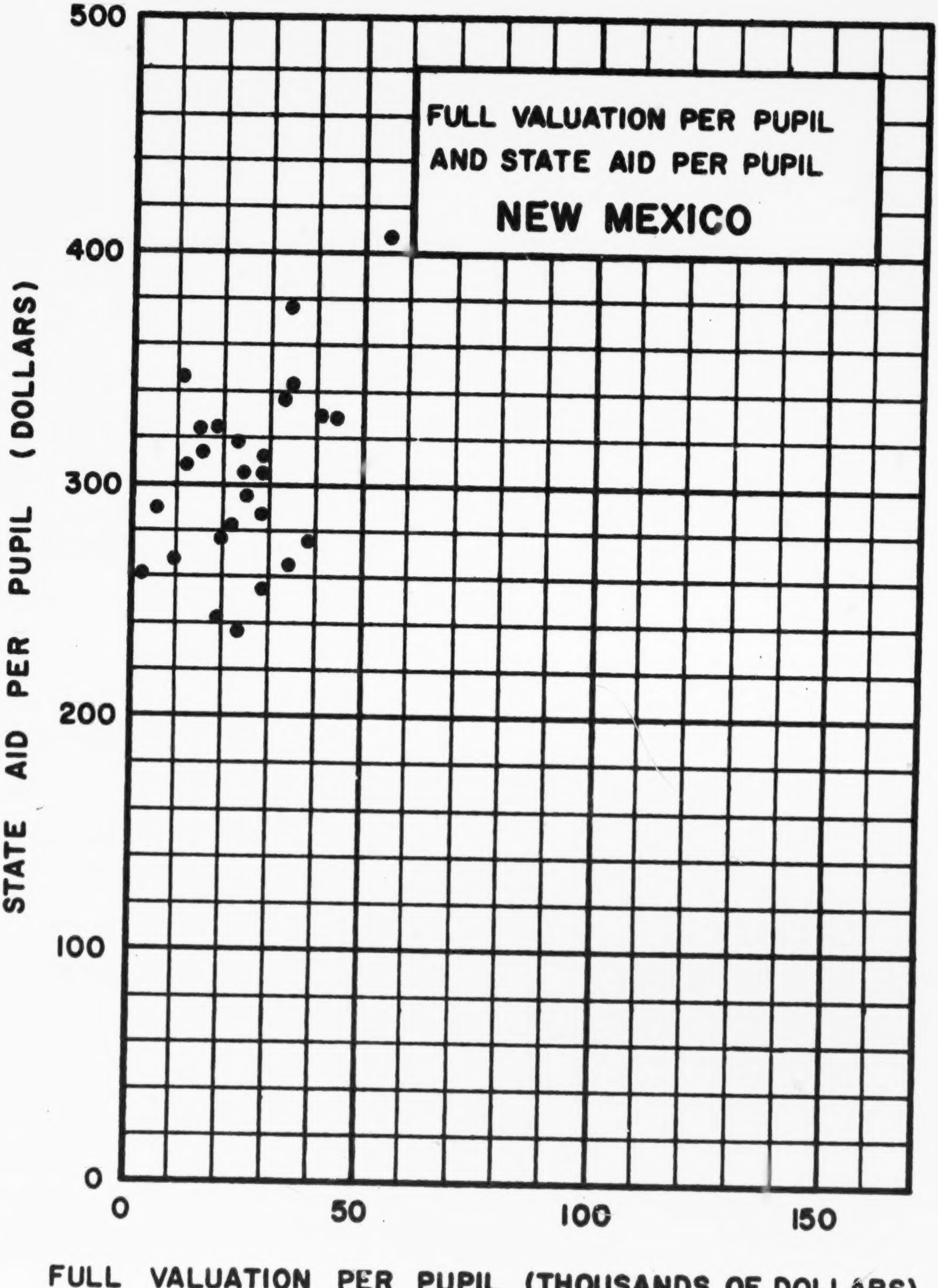
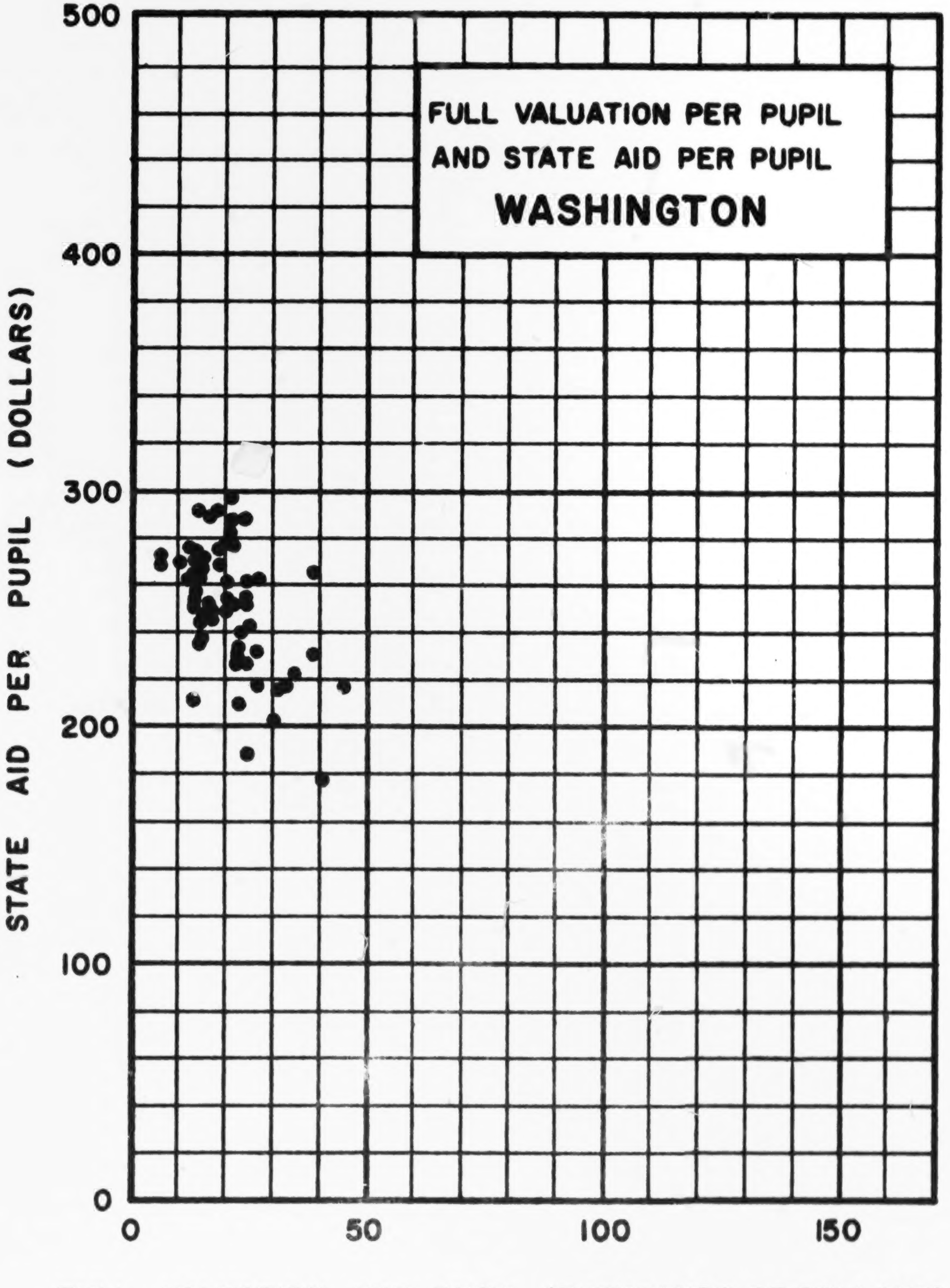

FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
NEW MEXICO
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

Chart 10


FULL VALUATION PER PUPIL
AND STATE AID PER PUPIL
WASHINGTON
STATE AID PER PUPIL (DOLLARS)
500
400
300
200
100
0
0
50
100
150
FULL VALUATION PER PUPIL (THOUSANDS OF DOLLARS)

effect and ensure prescribed levels of support from the property tax, as notably evidenced in New York. The consequences of these governmental constraints are more readily observed in connection with the following analysis of expenditures.

Variation in expenditures

Mean expenditures per pupil are presented in Table 4.

Table 4

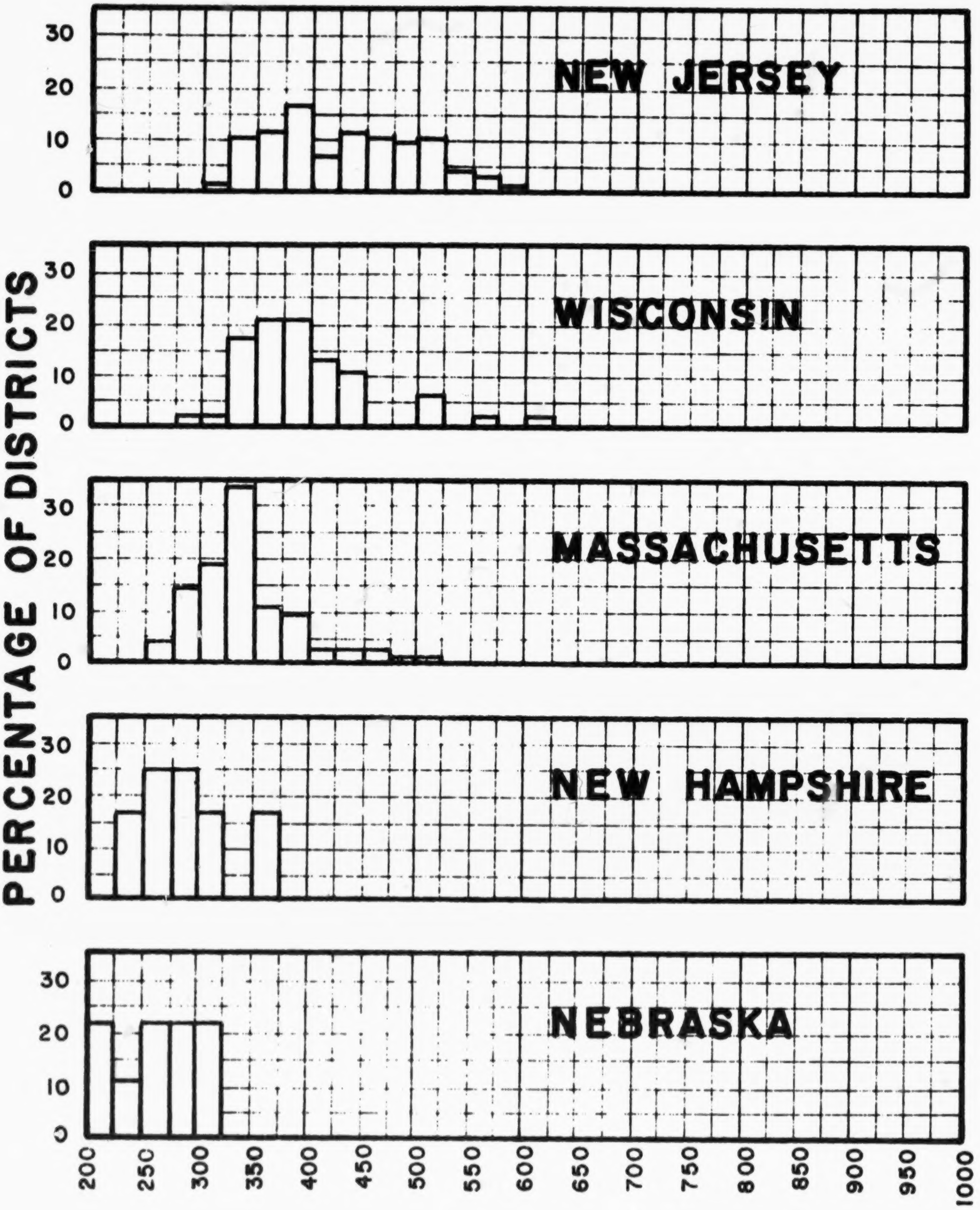
Means, standard deviations, and coefficients of variations of current expense per pupil, 1958-59

State	Mean Expenditure Per Pupil	Standard Deviation	Coefficient of Variation
Nebraska	$ 269	34	13
New Hampshire	291	12	4
Massachusetts	340	49	14
Wisconsin	394	62	15
New Jersey	435	67	15
Oregon	406	46	11
California	406	61	15
New York	536	104	19
New Mexico	342	40	12
Washington	378	31	8

Charts 11 and 12 show the distribution of expenditures within states by percentage of districts in the sample.

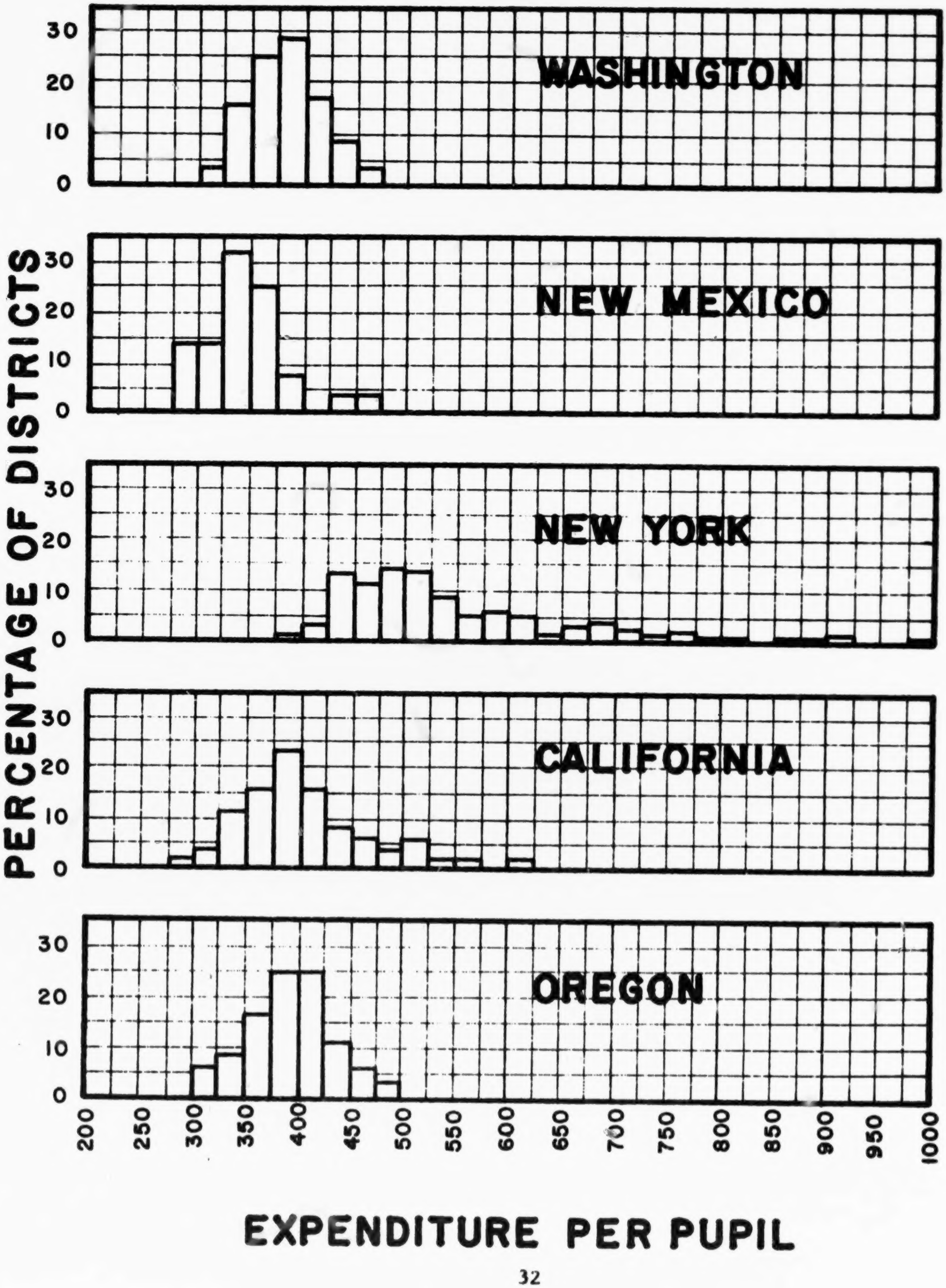
Levels of expenditure rise rather consistently with levels of state support to New York's level, then drop off sharply in New Mexico and Washington. Again, no support is given to our hypothesis that variation declines as the level of state support rises. The lowest variation in expenditure is found in one of the lowest state-support states, New

Chart 11



EXPENDITURE PER PUPIL

Chart 12


WASHINGTON
NEW MEXICO
NEW YORK
CALIFORNIA
OREGON
PERCENTAGE OF DISTRICTS
0
10
20
30
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
EXPENDITURE PER PUPIL

Hampshire, and the variation and relative variation in Nebraska, the lowest state-support state, is little different from that found in Washington and New Mexico, the two highest.

In the previous study we suggested the possibility that differences in per pupil valuation among states were distorting our results. However, when we allowed for these differences the results were the same.

In this study we took further steps to reduce the sources of variation. Using a multiple regression technique,[6] we held constant certain variables associated with ability to pay taxes and demand for education: equalized values, median years of schooling, percent of unemployed, percent of owner-occupied housing, median family income, percent of non-white, percent of farm population, and percent of children in private schools, and noted the mean expenditure per pupil predicted for each state under these conditions, as shown in Table 5.

With the variation due to these explanatory variables removed, our rationale then points to interstate variations in the governmental structure and "rules of the game" within which decisions on school finance are made as a promising source of explanation for much of the remaining variation in expenditures.

Throughout this study our interest has divided between variations within the states to which we directed our hypotheses, and variations among states, about which no explicit hypotheses were formulated. We noted in the earlier report, however, our assumption of normative pressures growing out of a homogeneous core of expectations for educational services. If true, then districts of similar socio-economic characteristics, gathering revenues for schools with the property tax under similar rules, would arrive at similar levels of expenditure; but state interference, either by making additional revenue available from other sources or by changing the rules, should have predictable consequences on district expenditures.

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[6] See Chapter Four for a discussion of the technique.

Following this line of reasoning, we analyzed the kinds of state actions that might affect the level of expenditure. They include the following:

(1) Increase in state support. In a state where all school revenue is derived from locally voted property taxes, the voters' desires for educational services are weighed in relation to their willingness to pay taxes, to determine the level of expenditure for education. The extension of state support into such a situation can be viewed as state interference with this equilibrium, and the effect predicted will be either higher expenditures or lower property taxes.

(2) Conditional support. State support provided on condition that local contributions be increased can be expected to increase expenditures. Special-purpose matching grants are the prototype, but the percentage-equalizing grant, used in Wisconsin and more recently in Rhode Island and to a limited degree in New York, appears to be setting a trend in general-purpose equalizing grants.

(3) Mandated programs. The state's defining of minimum standards of performance, with which local districts must comply before state funds will be extended, increases local expenditures levels.

(4) Mandated levies. The state's defining of minimum levels of education costs, whether specified as rates to be levied or as amounts

to be raised, tends to reduce the substitution effect of state support and help ensure that state funds will be used for educational services rather than for reducing property taxes.[7]

(5) Levy limitations. States frequently define tax limits (usually specified as rates but sometimes as amounts) beyond which local units are not permitted to vote taxes, or beyond which taxes cannot be increased without special tax elections. These limits usually are established at the time that increases are made in state support, and they are intended to ensure that such increases are used to reduce tax burdens on property. They encourage, and sometimes require, the substitution of state aid for local taxes. At least two distinctions among levy limitations can be made: those limits that can be by-passed by vote of the people, and those that cannot; their effects on expenditures probably differ.

In addition, other types of state interference with the postulated equilibrium between demand for educational services and resistance to raising local taxes can be found, notably state specification of major components of expenditures, as in state salary schedules for teachers, but the five we have discussed appeared to be the important ones in the states under study.

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[7] The director of this report has given extensive attention to mandated levies, and urged in the previous report that the U. S. Office of Education begin gathering data that will permit more extensive study of them. For purposes of analysis and under certain conditions, they can be combined with state aids as having the same effect, with important informational gains.

Table 5

Expenditures predicted per pupil by state with certain factors of ability and demand held constant, together with associated conditions of state interference

State	Expenditure Per Pupil		Factors of State Interference		
	Predicted	Actual	State Aid Per Pupil[a]	Extimated Mandated Levy Rate(in mills)	Levy Limitation (in mills)
Nebraska	$ 314	$ 269	$ 14	(none enforced)	0
New Hampshire	314	291	6	(none enforced)	0
Massachusetts	344	340	46	5	0
Wisconsin	429	394	59	5	0
New Jersey	407	435	74	5	0
Oregon	421	406	147	5.9	0
California	356	406	169	2.6	3.9
New York	540	536	290	7.3	12.5
New Mexico	370	342	307	1.2[b]	2.4
Washington	403	378	250	2.8	2.8

[a] The figures for state aid per pupil differ from those given in Table 2 because this table shows the mean amount per pupil for districts included in our study, whereas Table 2 shows means of all districts in each state.

[b] New Mexico requires each county to levy 5 mills on the assessed valuation (equivalent to 1.2 mills on full valuation), which is distributed commingled with state funds allocated in each county on the basis of budget hearings. The county-wide levy has the effect of a mandated levy. We chose to treat the proceeds as state aid in computing the voluntary levy (because it is not determined by the district, and is indistinguishable from state funds), but in this context it seems appropriate to treat it as a mandated rate.

Because of low elasticity in the property tax, we would expect shifts to income or sales taxes to be associated with fairly broad increases in expenditure, as pent-up demand for educational services are satisfied with no new increases in property tax. Thus, initially at least, expenditures should rise as state subventions rise, as indeed they do in Massachusetts, Wisconsin, New Jersey, and Oregon. The fact that in Wisconsin expenditures rise more than expected is probably accounted for by two additional items of state interference with stimulating effects: (1) a type of incentive system that increases state support as local levy rates increase under certain conditions; and (2) a rather extensive set of qualitative and quantitative educational standards that must be met in order for local districts to be eligible for any state aid.

In the next higher pair of districts in the scale of state subventions, New York behaves as expected, but California does not. Again we seek our explanation in changes in items of state interference: New York enforces a mandated levy rate half again as large as the states lower in the support scale, while California's is only about half as large as those states lower in the scale and is only a third of New York's rate. The substitution effects to be expected are evident in California's lower expenditures. In New York the state funds are added to local funds and expenditures are increased, whereas in California the higher state funds substitute in large part for local levies. The substitution effect is further enhanced by the addition of a fifth item of state interference, limitations on rates that can be levied by the local school districts without special votes of the people. In New York, however, the limitations are less extensive and less restrictive and therefore affect only a few districts; but in California the limitations govern all school districts, are lower than mean required rates, and are therefore much more restrictive, affecting most school districts. The result is a marked displacement of California mean expenditures from the expected position in Table 5. Furthermore, in actual practice California levy limitations are even more restrictive, because while New York limits are stated in terms of full valuation, California's are stated in terms of assessed valuation and therefore are subject to additional manipulation by local assessors.[8/]

The effects of state interference are most strikingly evident in the two high-support states, Washington and New Mexico. In these states, effective limits on full-value levy rates are even more restrictive than in California, thus further enforcing a state policy of substitution, and sharply limiting local tax yields. Furthermore, in New Mexico the mandated rate is indistinguishable from a state rate, thus enforcing full substitution of state for local funds, with the expected effect on expenditures.

The voluntary levy rate

In each of the ten states, as we have seen, a minimum local contribution to educational costs is mandated by the state, or an interference of a mandate can be drawn. To test whether increasing state support reduces voluntary local levies, we subtracted the mandated levy rate from the required rate to produce the voluntary rates shown in Table 6.

[8/] We have, of course, converted the California rate limitations to full value of rates in Table 5 by adjusting for the average state-wide assessment ratio.

It will be recognized that the rates are voluntary only in the sense that they are locally determined.

Table 6

Mean voluntary levy rates and standard deviations in selected states, 1958-59

State	Mean Voluntary Levy Rate (in mills)	Standard Deviation
Nebraska	8.8	1.6
New Hampshire	12.5	1.5
Massachusetts	6.9	1.8
Wisconsin	4.7	1.7
New Jersey	6.4	2.7
Oregon	6.6	3.1
California	3.0	1.1
New York	3.6	3.8
New Mexico	.6	.8
Washington	.8	1.5

The decline in voluntary levy rates as the level of state support rises is fairly consistent and provides strong evidence of the expected substitution effect of state aid. We noted in the earlier report that the evidence was persuasive but not conclusive that higher levels of state support tend to reduce local levies.[9/] On the evidence from five additional states summarized in Table 6 we conclude that unless the state interferes specifically and purposefully to inhibit or prevent the substitution, state funds will be used rather generally to reduce local property taxes.

[9/] The rho between ranks on level of state support and ranks on voluntary levy, which was -.70 and not significant at the .05 level of confidence in the five states previously reported, is -.73 for the ten states, significant at the .02 level.

The voluntary expenditure per pupil

The current expense of operating the schools was reduced by all revenue receipts applicable to current expense except that portion of the local levy not mandated by the state, and the remainder was divided by the resident ADA (because the costs of non-residents had been removed by subtracting tuition payments and all other revenues accruing from non-resident ADA) to yield the voluntary current expenditure per ADA as shown in Table 7.

Table 7

Mean voluntary expenditures per pupil as a percent of total expenditures in selected states, 1958-59

State	Mean Voluntary Expenditure Per Resident ADA	Voluntary Expenditure as a Percent of Total Expenditure
Nebraska	$220	82 %
New Hampshire	282	97
Massachusetts	169	50
Wisconsin	134	34
New Jersey	184	24
Oregon	125	31
California	109	27
New York	84	21
New Mexico	10	3
Washington	14	4

The expected decline in local voluntary expenditures is evident and fairly consistent, both in dollars and as a percentage of total expenditures.[10] Clearly, higher levels of state support are associated with reduced local voluntary expenditures in these states; but as we have pointed out, the reasons for the association may pertain less to any decline in voter initiative than to state interference in limiting the voters' access to local resources, thus possibly frustrating local initiative.

Conclusion

Our current findings, like those of our previous report, support the general notion that school finance systems are purposive, but that purposes pursued often are in conflict. They leave considerable doubt that high-support states are any more successful than low-support states in equalizing property tax burdens, and perhaps in equalizing educational services. The explanations for this apparent failure to accomplish an often-stated purpose of school finance systems must be sought in the complex behavior that results from conflicting purposes at both the state and local level. The major conflict at both levels is over increasing education services versus reducing taxes; and at the state level further conflict surrounds efforts to equalize benefits and burdens among districts, to shift the incidence of school taxes among alternative tax bases, and to stimulate and direct the flow of revenue into specified educational services. In the resulting conflict situations, educational purposes may suffer either from state-level neglect or from state-level interference, but on the evidence examined we conclude that they suffer more from neglect.

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[10] The rho between ranks in level of state support and ranks on voluntary expenditure, previously reported at -.80, not significant for five states, is -.81 for ten states, significant at the .01 level of confidence. The rho between rank on level of state support and rank on voluntary expenditures as a percent of current expenditure, -.90 and significant at the .05 level for five states, is -.80, significant at the .01 level for ten states.

We conclude that raising levels of state support will increase expenditures for education under specified conditions; for while pressures inhibiting increases in local taxes will balance demands for increased expenditure at a given level, the introduction of state-collected income and sales taxes will allow expenditures to rise to a higher level because of the greater elasticity of the yield of state taxes, and also because the total tax base is broadened. However, a point will be reached where further increases in state support will be used to substitute for local taxes if state mandates are not established. Furthermore, legislative intent to encourage such substitution appears at higher levels of state support in the limitation imposed on local power to tax.

CHAPTER THREE

SOME CASE STUDIES OF THE EFFECTS OF CHANGING REVENUE PATTERNS

An extension of the U. S. Office Research contract under which this study was made permitted us to look at the behavior of expenditures in selected school districts of the ten states when changed conditions affected the sources of school revenue.

We asked the Chief State School Officers in the ten states to select one, two, or three school districts, preferably but not necessarily of more than 1,500 pupils, in which one or more of the following changes had occurred in the past ten years:

1. a district in which Federal aid had risen from a small fraction to a major fraction of the district income, or one in which Federal aid had been a major fraction of district income but dropped to a small fraction; or

2. a district in which state aid had risen from a minor fraction to a major fraction of district income, or had declined from a major to a minor fraction; or

3. a district in which some addition to the tax base, such as a new industrial complex, or some loss from it, such as the removal or destruction of a big industrial component, had sharply altered the wealth per pupil.

We made clear our interest in the most unusual shifts in revenue sources, and requested further that if some unspecified condition had occurred which sharply altered conditions in a district, the district should be included.

The purpose of this case-study approach was to observe how district expenditures were affected by changing conditions under the several categories of "rules of the game" provided by the states under study. One difficulty in studying the behavior of school district expenditures is the virtual impossibility of setting up experimental situations and manipulating the variables involved. By deliberately searching out districts in which the relevant variables were changed over time, we hoped to gain some further insights into the processes under study, and to test whether expenditures behaved in predictable ways when the independent variables were altered.

A simple system of categorization was used to organize the estimates of how districts should behave under the different patterns of revenue allocations; it is outlined below. Since the categories were derived inductively from the analysis found toward the end of Chapter Two, they are applicable only to the ten-state sample with which we worked.

Category 1. Low state support, no mandated levies enforced. In this category are Nebraska and New Hampshire. We would expect any sharp increase in other than local revenue to be reflected first in increased expenditures, with any substitution effect on local levies lagging, and being highly correlated with levy rates. Conversely, any sharp reduction in other than district revenues, or in district valuation, would be first reflected in reduced expenditures, with increases in rates occurring in inverse proportion to the level of the rates at the time of the loss.

Category 2. Low state support, and mandated rates enforced, with a sub-category for an incentive to raise taxes. In this category are Massachusetts, New Jersey, and Oregon, with Wisconsin in the sub-category. Again, we would expect increases in other than local revenues to be reflected first in increased expenditures, with the substitution effect delayed in the low-tax-rate districts by the effect of the mandated levies. As the level of outside revenues increases, the substitution effect would be expected to increase proportionally with the level of district levies at the time of the change. A reduction of revenue or local valuations would be expected to cause responses similar to Category 1. Wisconsin districts would be expected to behave in similar fashion, except that increases in expenditures would tend to be more evident in the first instance, the substitution effect would be dampened in the second instance, and rates might be expected to rise more rapidly in the third.

Category 3. High state support, with mandated rates enforced and levy limitations established by the legislature. In this category are New Mexico and Washington, with California and New York in separate sub-categories to reflect their greater local tax leeway, and New York's high mandated rate. Increases in other than local revenue may be expected to exert some upward pressures on expenditures, but mostly to substitute for local levies, except in New York, where the high mandated levies dampen the substitution effect in the wealthier districts, and local levies are allowed to rise toward the less restrictive ceiling in low-value districts and indeed in all districts generating high demands for education. The most striking effect to be anticipated in this category, however, is the degree to which Federal funds may be expected to substitute for local and for state taxes, with the effect being least evident in New York, rising in California, and being most evident in New Mexico and Washington. In fact we would expect Federal funds to have virtually no effect on levy rates in New Mexico and Washington because rates there are so rigidly controlled by state law. Therefore the Federal funds will either flow into increased expenditures, or substitute in part or in whole for state funds in these two states.

This inductively derived categorization can, of course, be logically expanded, and its usefulness can be tested on data from other states. For instance, using high-low support (2), high, low, and no mandated levies (3), high, low, and no levy limitations (3), and incentive - no incentive programs (2), a total of thirty-six classifications could be developed for state school support systems, some of which would probably not be needed to describe existing systems in the fifty states.

As we have noted, the first category is represented in our ten-state sample by Nebraska and New Hampshire. The small number of districts included in our sample from these two states precluded sharp estimates of expenditures behavior, and this limitation, coupled with an absence of dramatic shifts in revenue sources in any of the districts under study, left us little evidence to test our expectations of behavior of expenditures and levy rates. However, in one district in New Hampshire in which Federal aid increased from 30% of expenditures in 1952 to 42% in 1963, per pupil expenditures rose from 81% of the state mean at the beginning of the period to 104% of the state mean at the end of the period, while levy rates remained at about the same level, an indication that demands for tax reduction in that district, at least, were gaining less recognition than demands for increasing expenditures, and that more of the effects of Federal aid were evidenced in increased school expenditures.

A district in Nebraska serving an Air Force base and therefore receiving Federal funds appears to have increased expenditures to about the state average expenditure per pupil while allowing the local levy rate to decline below the state average. The evidences of substitution of Federal funds for local levy appear to be more evident than the use of those funds to increase expenditures, but again the absence of dependable estimates of expenditures as predicted by socio-economic factors make this evidence inconclusive.

The second category (low state support, mandated levies enforced, and a sub-category for an incentive program) comprises Massachusetts, New Jersey, Oregon, and Wisconsin.

Two rural districts recommended for study in Oregon experienced a marked increase in their property tax base; in one a power dam was added to the district tax roll, and in the second a large industrial plant was added. In the first district, the valuation per pupil rose from less than $20,000 in 1956 to over $80,000 in 1961. During the period of this change and the subsequent year, the following pattern emerges:

(1) Local tax rates dropped abruptly at first, and then rose to a point slightly higher than their previous levels.

(2) The percent of the budget met by local sources went from 27% to 71% of the total.

(3) State support dropped from 53% to 23% of the district budget.

(4) The current expense per pupil rose from 84% of the state average expenditure to 120%.

(5) The percent of the budget going for instruction actually declined slightly -- from 68% to 64%.

The immediate effect of the tax-base increase, then, was a substantial reduction in the tax rate, accompanied by an increase in the local share of cost and a decrease in the state share. However, the succeeding year shows the influence of population changes associated with the construction of the dam, as tax rates rose again to a point slightly above the previous level, and expenditures overtook and surpassed the state average. Though aggregate salaries increased, the percentage for this line item dropped, reflecting a response to demands for other than instructional services. The two categories that increased most were transportation and operation, both of which probably reflect an accumulation of demands from previous years. In the opinion of the superintendent, if the population had remained static, the increase in tax base would have resulted primarily in tax relief and only incidentally in an increase in the educational services. However, the newcomers attracted to the area by the industrial activity appear to have voiced demands for increased services, and support for their demands was sufficient to increase the local levies beyond their previous level.

The tax base in the second district rose from about $11,000 per pupil in 1958 to over $50,000 in 1959, with the following results:

(1) Tax rates declined at first, but later recovered some of the loss.

(2) The percent of the budget obtained from local revenue rose from 37% to 70%.

(3) State support dropped from 51% of the budget to 24%.

(4) Expenditures declined in relation to the state average from 101% to 92%.

(5) The amount allotted for instruction rose from 59% of the budget to 69%.

There was only a moderate population change within the district during the year. The immediate response to the tax-base increase was local tax relief and a shift from state to local support. Though the residents who demand increased educational services have been partially successful in subsequent years in restoring tax rates to their previous levels, the program has suffered a decline in comparison with the average for the state. Within the budget, the proportion used for salaries increased more than other items.

The examination of these two Oregon districts suggests that, given a stable population, the demands for educational services were less well served than the demands for tax relief. A sudden increase in the ability to pay for better services did not, in itself, bring an equally rapid rise in expenditure levels.

Two districts in New Jersey were studied, one in which there was a significant increase in Federal aid and one in which the addition of a large industrial complex to the community resulted in a substantial addition to the local tax base.

Of all the districts studied in the Northeast, the New Jersey district that received funds under Public Law 874 demonstrates the most striking example of the substitution effect. Beginning in 1957 an Army Post and an Air Force base nearby greatly expanded the number of personnel they employed. The school population of the district increased from 335 in 1957-58 to 2,360 in 1960-61. During this same four-year period, however, local tax monies declined from 49% to 3.25% of the total revenues available for school purposes, and the actual dollar yield also declined. Although the assessed valuation increased by approximately one-third, the tax rate dropped sharply from 90 mills on the assessed valuation to about 16 mills. Federal funds, which substituted for local revenue, increased during this period from 7% to 57% of the total funds available. The percent of state aid allocated remained relatively constant, decreasing only slightly from 44% to 40% of the total revenue.

Current expenditures per ADA during this period dropped sharply, in contrast to a nationwide trend of rapidly increasing expenditures. In 1957-58 the average expenditure per pupil in ADA in this community was $302.48, or 91% of the state average. By 1960-61 the average expenditure per pupil in ADA had dropped to $248.51 or only 51% of the state average. The substitution effect of Federal funds for local levy is evident; the district chose to use the Federal funds to reduce local taxes, rather than to increase expenditures and thus improve the educational program.

In the second New Jersey district, increased revenues from an industrial addition to the local tax base were used for increased educational expenditures. In 1953, a major heavy industry built a subsidiary factory in the community that employed 5,000 persons. Stringent zoning regulations, requiring a minimum of two acres for a home building site, coupled with high property costs precluded the influx of large numbers of the industrial workers into the district, with the result that the community did not experience any sudden increase in school enrollment. During the period from 1952-53 until 1960-61, both the tax rate and the expenditure per pupil in ADA doubled. Current expenditures per pupil in 1952-53 were 109% of the state average; by 1960-61 they had increased to 133% of the state average. A line-by-line analysis of current operating expenditures does not show any sharp change in expenditures in any particular line item. In each category, increases tended to be generally proportional to the total budget increases. State aid, which represented a fractional part of total revenues available in 1952-53, declined slightly during the period, from 13.6% to 7.9%.

This sharp rise in school expenditures, however, was not accomplished painlessly. There is some evidence that conflict was generated between the older residents, who possessed large property holdings, and the newer junior executives and highly skilled workers, who moved into the community after the factory was built. During the period there was a turnover in both the superintendency and the high school principalship. As in the Oregon case involving newcomers attracted by industrial activity, the level of expectations for educational services appears to have been raised sharply by the newcomers.

Three districts in Massachusetts were recommended to us for study. In two districts, however, the changes in revenues were in magnitude rather than proportion, for although the actual dollars involved increased considerably, so did the population, and the percentage of dollars coming from state, Federal, and local sources changed only slightly. An analysis of the line items for current operating expenses and the per pupil expenditure as a percentage of the state average expenditure also demonstrated relatively little shifting.

The third district, a rural community that became highly suburbanized during the period 1952-61 because of the development of a nearby complex of electronics industries, showed an increase in the local share of current costs (from 62% to 78%), and a sharp decline in the percentage of revenue from state sources (from 37% to 18%). While the enrollment increased almost four-fold and the assessed valuation six-fold, the local tax rates were increased only by about 3%. The resulting increase in local revenues was sufficient to offset the reduced proportion of state funds and to improve the educational program slightly; based upon the percentage of expenditures per pupil in ADA in comparison with the state average, expenditures increased from 62.2% of the state average to 65.6%.

Until the present time, the older, rural residents holding lower educational expectations have been able to maintain control in the community. Officials in the district noted some indications that conflict is being generated between this group and the newer highly skilled and professional residents, with their higher expectations. On the basis of the Oregon and New Jersey cases, we would anticipate that the expectations will be served, and that both expenditures and tax rates in this district will rise in the near future.

The Wisconsin program, with low average state support and a mandated levy of 5 mills on the full value of property enforced, has an incentive feature that provides increased support from the state in low-valuation districts proportional to the levy rate of the district, and inversely proportional to the valuation per pupil. We anticipated that the substitution effect would be dampened in comparison to the effect observed in other states in the category, that expenditures would be more apt to rise with increased aid, and that tax rates would be more likely to be maintained at high levels as outside revenue increased.

Three districts were selected for us, two in which state aid had risen markedly in proportion to costs, and one in which the Federal funds were reduced sharply because Federal properties were transferred to the local tax base. Our analysis showed, however, that the state share rose in the first district because district reorganization shifted costs formerly borne by tuition-paying areas to the state, leaving the district's proportional share of costs relatively unchanged during the period. The expenditures actually made by the district in 1958-59 were somewhat higher ($42 per pupil) than the level predicted from our socio-economic data.

In the second district, however, the state share of current costs rose from 32% to 55% from 1952 to 1962, and the local share dropped from 41% to 30%. During this period the district levy was maintained at a very high level, about 16 mills on the full value in contrast to a state average of about 10 mills, and school expenditures rose from 97% of the state average at the beginning of the decade to 109% at the end. We conclude that the Wisconsin aid law provided sufficient incentive to both of these districts to keep their tax levies at high levels and to use the additional state funds so obtained to improve educational services rather than to reduce local taxes.

The remaining Wisconsin district had very little local valuation early in the 1950's, because most of the property was in a Federal housing project. During the decade the Federal government transferred much of the property to private ownership, and the local share of current costs rose from 3% to 31% while the Federal and state shares declined. We expected that the incentive feature of the Wisconsin law would encourage the district to maintain a high local levy to compensate for reductions in the proportion of state and Federal funds, and in fact the district, which levied 15 mills on the full value of property at the beginning of the decade, maintained its rate to the end of the decade. Expenditures per pupil, which were 109% of the state average at the beginning of the period, had increased to 132% of the state average at the end. Our socio-economic indicators gave us an estimate of $458 per pupil in 1958-59, whereas actual expenditures were $517 per pupil. Again we conclude that the incentive features of the Wisconsin finance program encouraged the district to improve educational services, even when the proportion of state and Federal funds decreased.

An interesting feature of the Wisconsin law is the provision that the local share of the costs of current operation shall not exceed 15 mills on the full valuation of district property. If more funds are required to meet the costs after all current receipts, a 15-mill local levy, and normal state aids are deducted, then the state provides the additional funds. In a district eligible for these excess-cost funds, any increase in Federal funds will reduce the state funds by the amount of the increase, and in the normal computation of the incentive aids, the Federal funds substitute for state funds in inverse proportion to the district valuation per pupil, i.e., the lower the district valuation, the higher the substitution effect of Federal funds for state funds.

We examined line-item expenditures to see if shifts in revenue sources were associated with shifts in the "mix" of educational services, but found no evidence of any major consequence that they were. The district bearing a rising share of the costs of education from the state increased its allocations to administrative services by about 2% and to teachers' salaries by about 3%, and increased allocations to maintenance and auxiliary services slightly. Class size increased slightly in the district whose costs shifted to the local base, and decreased slightly in the district whose costs shifted to the state.

The third category (high state support, mandated rates enforced, and levy limitations established by the legislature) comprises New Mexico and Washington, with California and New York in separate sub-categories with low and high mandated rates, respectively.

In New York two districts were studied, one receiving a significant increase in Federal funds and one in which there was a substantial increase in the local tax base because of the building of an electric power plant.

The expansion of an Air Force base in upstate New York from a minor to a major installation had a definite impact on the local school district. School enrollment in the six-year period from 1954 to 1960 more than tripled, while assessed valuation rose only about 150%. During the same time the local average expenditure per pupil in ADA, based upon a percentage of the state average expenditure, remained relatively constant. In 1954-55 this percentage was 88%; by 1960-61 it had risen slightly to 91%. The dollar increase, however, was considerable, from $319.34 to $444.11 per pupil. In order to maintain this level the district had to raise its local property tax rate approximately 17%.

State aid, on the other hand, which at the beginning of the period of expansion amounted to 81% of the total revenues, declined to 59% by 1960-61. Federal funds rose from nothing in 1954-55 to 20.6% of the total funds available in 1960-61. Here, as in Wisconsin, the substitution effect of Federal funds is apparent on state funds, but not on local funds.

The other New York district, encompassing a suburb located in the Capitol Cities area, used the additional local tax revenues resulting from the installation of an electric power plant to maintain an already excellent educational program during a period of rapidly rising expenditures per pupil in ADA. From 1954 to 1961 the average expenditure per pupil in ADA remained at approximately 150% of the state average. The full valuation of taxable property per pupil increased approximately 16%

over this period, which reduced state aid paid under the New York equalization formula from about 32% to about 25% of the current school revenues. Consequently, it was necessary to increase the local tax rate from about 11 mills to about 15 mills. The net effect of the addition to the tax base therefore was to allow the district to maintain a stable educational program at a lower tax rate than would otherwise have been possible, and to reduce the need for state revenues as that need was defined under the state aid program.

Three California districts were selected. In the first, a small rural community, the decline and final liquidation of a local lumbering enterprise reduced the tax base by one-third over a four-year period. During this period, an exodus of population occurred, probably because the closing down of the lumbering activities reduced employment opportunities, so that average daily attendance in the district schools decreased by one-half. Thus, a district that initially appeared to have undergone a change from "high" prosperity to "low," by the criterion of the California support formula, in fact, experienced an increase in valuation per pupil of approximately $2,000. However, the district was able to cut its tax rate during the period from 33 mills to 13.5 mills and still obtain maximum benefits under the California support system. The state share of costs rose from 56% of current revenues to 75% and because of the increased state contribution, the total cost of education per ADA remained at much the same level. The total current expenditure showed very little change throughout the seven-year period, but the position of the district relative to state average expenditures shifted from well above the state average in expenditure, to slightly below the average.

One may speculate that among those who left the area were many of these members of the community with the highest educational expectations. In any event, income certainly declined, and unemployment increased to twice the state's average rate. Under these circumstances, it is not surprising that the district has given more attention to reducing the property tax load than to improving educational services. Despite increases in the state average level of expenditures for schools, in this district the level has remained unchanged - - has in fact declined in comparison to average practice - - and the tax load has been cut in half. Some of the tax cut was made possible by limiting the program, but much of it was made easier because state support continued at maximum levels in spite of program restrictions and the tax cut. We note that the 13.5 mill levy on assessed value, when corrected to full value, is about 6 mills, less than the mandated rate in New York.

In this particular instance, the community was able to lessen the local contribution, rely more heavily on the increased state support, and still maintain a program fulfilling the educational needs as it defined them. The substitution effect in the absence of high mandated levies is most evident here, and increased state funds were used to reduce taxes, rather than to raise, or even maintain, the level of local expenditure.

The second district, prior to its recent unification, had as its components four elementary districts and one high school district. Two of the elementary districts had high valuations and consequently comparatively low tax rates. One of the remaining elementary districts and the high school district tripled in enrollment within the four-year period studied, principally because of increased activities at an adjacent Air Force base. While this tremendous growth in enrollment was taking place, increases in assessed valuation were only 45% in the elementary district and 38% in the high school district. The tax rates were held constant in both districts, and the state contributions per pupil remained constant. Federal funds under Public Law 874 increased from nominal amounts to almost 30% of the total income for the elementary district and to slightly more than 20% of the high school district's current income. Notwithstanding these substantial increases in Federal funds, both districts showed a decrease in total current expenditure relative to the state average. The elementary district's expenditures dropped from about the state average to 17% below it. In the high school district the decline was from 3% below the mean to 23% below. In each instance the Federal funds were inadequate for the district to maintain its relative position within the state, and local demands were not sufficient to secure an increased local contribution.

The recent unification of these growing districts with the three smaller elementary districts ensured the imposition of the higher tax rate of the larger districts on a previously "untapped" valuation of the smaller districts. The result of this action in terms of an increase in total income, however, was insignificant. The low relative expenditure level persists.

Thus we note in both the rural lumbering community and the recently unified district that under the California aid system a district may easily allow both state and Federal funds to substitute for local effort.

Furthermore, though it is not revealed in the analysis of these districts, the California equalization formula results in some substitution of Federal funds for state funds, which may rise to about 25% in high equalization districts.

In the second community, the added revenue derived from Public Law 874 as well as the increased state funds did not keep pace with costs resulting from the increased enrollment. Hence, the district did not maintain its relative position with other districts, even though the previous tax rate was maintained. The community tried to improve the situation by unifying the districts and extending the higher rate of the larger districts to the other three districts, but the effect on total revenues was negligible.

The line-item expenditures were examined to see whether the shifts in income sources affected the expenditure distribution. In general, we noted little change of any consequence. A slight reduction in certificated salaries and other instructional expenses, as a percent of the total expenditure, were the initial response to the onset of a "tight" money period in the lumbering district, indicating that instructional personnel were probably reduced more rapidly than other cost items. In the second community, certificated salaries, again as a percent of the total, increased slightly, with accompanying reductions noted in the categories "transportation" and "fixed charges." None of these shifts were of a magnitude to suggest that any particular significance could be attached to them.

A third California district -- an elementary district -- was studied because, though revenue patterns remained stable, an unusual shift in the composition of the population occurred during a period of growth. The population increased from 4,364 in 1950 to 16,058 in 1960, and elementary ADA increased from 1,072 to 3,771. The median years of schooling of persons twenty-five and over changed from 10.6 years in 1950 to 12.6 years in 1960, a marked shift by comparison to an increase of only half a year for the state as a whole during the same period. Males employed as professional, technical, and kindred workers as a percentage of the total male employed group increased from 8.3% in 1950 to 36.9% in 1960, a 28.6% increase as compared to a 2.4% increase for California as a whole.

These changes are largely due to the fact that a major portion of the labor force is now employed by prime contractors to the Atomic Energy Commission. In the elementary schools, 56% of the total enrollment are children defined under Public Law 874 as "federally-connected," which means that one or both of their parents are employed by a company working on a Federal project.

The newer residents have recently gained control of the governing board. In 1963, three members of the five-member board had come to the community in the past ten years and were employed by companies involved in Federal projects. The other two are lifetime members of the community. It may be significant that the superintendent who had served the community during its rural period was replaced by a superintendent from a wealthy suburban school system; and that in a recent tax-election controversy, the three newcomers voted to authorize a tax election for an increase that the two old members opposed.

General Fund income per ADA, as noted above, remained stable over the decade:

	1951-52	Percent of total	1960-61	Percent of total
Local	$ 73	33	$ 155	35
State	123	56	236	53
Federal	22	10	54	12
Total	$ 219		$ 448	

The assessed valuation per pupil was also quite stable during the period, ranging from $7,902 in 1951 to $7,167 in 1960.

During the period 1951-60, the tax rate for the elementary district increased from about 9 mills to about 20 mills on assessed property valuation. Several tax and bond elections were held during this period, with none failing to gain approval until February of 1963, when a proposed operating-tax increase was soundly defeated. This issue was defeated by such a large measure that the no votes must have included a great many of the newer residents. As noted above, the governing board had split three-two in favor of calling this election, with the division following the new resident-old resident lines.

Nevertheless, prior to this setback the district maintained steady increases in current expenditures per ADA, with the exception of 1954-55 when the district experienced a 61% increase in ADA in one year. Current expenditures rose from $172 in 1951-52 to $383 in 1960-61 as compared to state averages of $214 and $384. The expenditures by items were as follows, in dollars and as percents of the total current expense:

Dollars spent per ADA

	1951-52	Percent of Total	1960-61	Percent of Total
Administration	$ 7	4	$ 23	6
Teachers	120	70	227	59
Other Instruction	10	6	49	13
Auxiliary	3	2	9	2
Operation	17	10	36	9
Maintenance	2	1	19	5
Fixed	6	3	14	4
Transportation	6	3	6	2
Total current expenses	$ 171		$ 383	
State average per ADA current expense	$ 214		$ 384	

If the district had continued the tax levy at about the 9-mill level but had received the increased state and Federal aid, it would have supported the schools at a rate of 77% of the state average as compared to the former rate of 80%. Increasing the tax levy to about 20 mills added sufficient revenue to raise expenditures to the state average. It seems reasonable to attribute the increased local tax effort to the expression of greater demands for educational services, demands expected from the newcomers in view of their description as inferred from census data.

The defeat in the last tax election may indicate that the present level of educational services has reached the equilibrium point, and hence expenditures will level off; or it may have been only a temporary setback, probably associated with the 1962 recession, in which case the steady climb in expenditures may continue. Only continued observation will yield answers to these questions.

In New Mexico during the period 1952-62, school funds were allocated among the counties on a weighted per pupil basis and then were distributed within counties in proportion to the budgetary needs of the districts as negotiated by the Director of the School Finance Division, a state agency separate from the Department of Public Instruction. Three districts were suggested for study, one in which a Federal agency provided a large and stable proportion of the school costs throughout the decade, one in which the Federal share increased from nothing at the beginning of the decade to 16% by the end, and a third in which the local tax base lost a substantial asset when a mining company discontinued operations and removed its equipment.

In the first district, the Atomic Energy Commission furnished about 42% of the current costs throughout the decade. The state share of the costs rose slightly, from 49% to 55%, as contrasted with an average state share for all districts in the state approaching 75%. District expenditures per pupil were consistently higher than the state average expenditures, about 80% higher at the beginning of the decade and about 60% higher at the end, reflecting the high expectations of the scientific community served by the schools. The expenditures in 1958-59 were in fact slightly higher than our socio-economic data predicted; $452 per pupil was in fact spent, whereas the predicted figure was $437. Local valuation per pupil remained stable throughout the decade, and the local levy rate for current expenses remained fixed at the maximum allowed throughout the period at 4.45 mills on the assessed valuation. We concluded that Federal funds substituted in part for state funds, but the major part of the Federal funds permitted the district to maintain an educational program considerably above the state average level.

In the second district, Federal funds increased from nothing to about 16% of current costs by the end of the decade. During this period local valuation per pupil also increased, and the current operating levy was maintained at the legal maximum, thus increasing the local contribution to the program. State support decreased from about 83% to 75%. Expenditures per pupil remained stable in relation to state averages, about 28% above average expenditures for the state, and our predicted expenditures for 1958-59 were slightly below actual expenditures. Again it appears that the Federal funds substituted for state support, in this instance to the extent of about half of the Federal funds.

In the third district, the loss of the mining values was compensated for by increased state support, and state aid rose from 78% to 88% of current revenues over the decade while current cost levies remained at the maximum. Expenditures increased in relation to the state average from about 120% of the state average expenditure per pupil to about 130% by the end of the decade. Again the full substitution effect of state funds on local funds under very restrictive local levy limits is evident.

Two districts in Washington were studied, one because of a substantial increase in support from Federal funds under Public Law 874, and the second because of the construction of an oil refinery that more than doubled the district's tax base.

In the first district, Public Law 874 funds rose from 26% to 51% of the district's budget, while the percent of district revenue obtained from local sources declined somewhat, and the percent of district revenue from state sources also declined. The current expenditures per pupil rose from 93% to 105% of the state average.

The changes in the second district followed a somewhat similar pattern in that the percent of revenue from state sources declined from 90% to about 70% of the district's total, and the local revenue first rose from about 9% to about 17% of the total and then declined in succeeding years to about 11% as the district became eligible for revenue from other sources. Throughout the period, the expenditure level remained relatively constant at about the state average. Here, as in the first district, the local tax rate remained unchanged.

The superintendent of the second district commented that though the refinery constituted over 50% of the tax base, the board and community seemed unaware that a choice existed of either increasing expenditures or reducing tax rates. The additional revenue from local sources resulted in a substitution for state allocations on nearly a dollar-for-dollar basis. Special elections are authorized to levy a higher tax rate than that mandated by the state, but though much of the burden would fall upon the refinery, no elections were held.

Summary

These case studies appear to offer some further support for the rationale presented in Chapter One, and to conform generally to the behavior hypothesized at the beginning of this chapter. We examined districts in which unusual shifts in revenue sources occurred over time. The states were categorized according to level of state support, mandated levies, levy limitations, and incentive. The expected district behaviors were indicated for each category on the basis of the analysis in Chapter Two, and the district data were examined to determine how well actual behavior followed these expectations.

Category 1 comprised the states with low state support and no mandated levies enforced. As expected, increases in Federal aid resulted in increased expenditures in both of the districts examined. In one instance the substitution effect was not in evidence; in the other, though local expenditures increased, local rates also were reduced.

Category 2 comprised the states with low state support, with mandated levies enforced. One district with a high local tax rate at the beginning of the period under study responded to an increase in Federal funds by cutting the tax rate to one-sixth its earlier level, a striking example of the substitution effect of Federal funds on local levies. In each of the districts in which there was an increase in the local tax base, the resulting increase in ability was first reflected in increased expenditures, then in lower rates. We noted evidence to indicate that when an increase in the local tax base occurs in a rapidly growing community, subsequent behavior of the local tax rates are affected by the educational expectations of the newcomers.

Wisconsin was examined as a sub-category within this section since we expected their incentive plan to dampen the substitution effect with resulting increases in expenditures, and we found some support for this expectation. The substitution effect of Federal funds was apparent on state funds, but not on local in the low-value district studied.

Category 3 comprised the states with high state support, with mandated rates enforced, and limitations on local levies, and in a New York district the substitution effect of Federal funds was evident on state funds but not on local funds. As predicted, the substitution of Federal and state funds on local revenues was greater in California, which has a low mandated rate, than in New York. Again we found evidence, this time among California school districts, of the importance of shifts in the socio-economic makeup of the population on decisions to use funds from outside the district for local tax relief or for increasing educational services. The expectation that Federal funds would have virtually no effect on the rigidly state-controlled levy rates in New Mexico and Washington was supported.

PART II

Interactions of Wealth and Expenditures for Education

CHAPTER FOUR

WEALTH AND EXPENDITURES FOR EDUCATION

In this section, we will explore further the relationship between wealth and levels of expenditure for education. First, however, it would be wise to define the word "wealth." For our purposes, the simplest definition is in terms of the tax base upon which the support of public education rests. This tax base comprises, in the main, the values of real property, personal income, and retail sales; however, since data for the last are not generally available at the school district level, they must be omitted from this study. We will soon see that real property, is, indeed, an important factor in our analysis, although because of the well-known weaknesses in the assessment of this base, we shall be using estimates of true or equalized value rather than assessed value. Personal income statistics are not available at the school district level; we therefore use median family income data, which are reported in census publications. In sum, we will explore the relationship between equalized property valuation and median family income (as the independent variables) and per pupil expenditure for current operation of the schools (as the dependent variable).

The preoccupation with expenditure levels and revenue sources reflects the long-standing view that education is either a form of consumption or an investment made on behalf of the child and his parents.

Today, society's stake in the investment aspects of education receives the greater emphasis. In particular, it is claimed that expenditures for education will result in higher levels of per capita income -- that education is, in effect, one of the important means by which to attain economic growth, both at home and abroad.[1] But in this study, we consider both aspects of the relationship between wealth and education, recognizing that on the one hand, higher levels of property valuation and income result in higher levels of expenditure for education; and on the other hand, education produces a more efficient labor force, and higher levels of personal income.

In our treatment of the interaction between income and educational expenditures, we are faced with a complex set of variables. We seek to minimize the effects of some of these variables by using partial correlation and multiple-regression analysis to separate them. We attempt to distinguish the effect of wealth on educational expenditures from the effect of education on income. We propose to study the latter phenomenon by examining the effects of resource inputs on test scores and school-leaving age. We draw on other research to support the assumption that there is a relationship between achievement test scores, school-leaving age and expected lifetime income; the results will be found in Chapter Five.

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[1] For a review of these claims see John Vaizey, The Economics of Education, The Free Press of Glencoe, New York, 1962.

Equalized valuation, income, levels of aspiration, and expenditures for education

The main hypothesis on which this chapter and the following are based is derived from the general rationale stated in Chapter One. Expenditures for education depend upon the wealth of the community, the levels of aspiration which its citizens share with respect to education, and the institutional framework within which decisions are made on the resources to be devoted to education. If the level of aspirations of the citizens is held constant, those communities in which the ability to pay taxes is greater will desire to spend more. On the other hand, if the ability to pay taxes is held constant, the desired levels of expenditures will be higher where the levels of aspiration are higher. Finally, if the decision-making process is responsive to the wishes of the citizens, the desired levels of expenditures will be reflected by the actual levels of expenditures.

This chapter presents the results of an attempt to measure these factors and to examine their ability to explain empirically the levels of expenditures of the school districts covered by this ten-state study.

1. Measures of Tax-Paying Ability

Our ability to test the above hypothesis is weakened by imperfections in our ability to measure the current tax base. The greater part of tax monies for education is derived at the local level, where the property tax forms the major revenue source. Inequities in assessment -- among states, among taxing jurisdictions within states, and within taxation jurisdictions -- are well documented.[2] In spite of many improvements in assessment practices at the state and county level, it is often still not possible to form an estimate of the true value of the real property in a school district, and therefore difficult to estimate the taxpaying ability of a school district on that basis.

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[2] See Earl R. Rolph and George F. Break, Public Finance (New York: The Ronald Press Company, 1961), Chap. 15.

Neither is the value of personal income payments a perfect measure of taxpaying ability.[3] However, taken together, property valuation and income payments should give a more accurate estimate of taxpaying ability than would either of them taken separately. And if the value of retail sales were also known, the weighted sum of the three measures should provide an even better estimate of ability to pay taxes. It is recognized, however, that the concept of "ability to pay taxes" is subject to philosophical dispute. Not only is the concept unclear, but the relative merits of wealth and income as measures of ability is also in dispute.

One additional problem should be noted as troublesome here. We have divided our variables into measures of taxpaying ability, and indices that are presumed to be related to levels of aspiration. The use of the property tax in financing education offers another explanation for differences in expenditure levels -- the person who votes for the tax may not be the person who pays it. When large industrial holdings are located in a school district, there may be some tendency for the voters to decide on increased taxes because they perceive the relatively large public gains in relation to the impact of the tax on their personal holdings. If a large proportion of homes are tenant-occupied, the tax rate may be higher than if they are occupied by the owners.

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[3] Ibid., Chap. 6.

Assuming a large number of tenant-occupied homes, we must consider the question of tax-shifting. If property taxes are shifted to the tenant, the question arises: Do voters, in deciding tax rates, react to the incidence or to the impact of the property tax? In the belief that the latter occurs, we include as a variable the percentage of homes that are occupied by their owners, and hypothesize a negative relationship between this variable and expenditure levels.

2. Measures of Levels of Aspiration

In this study, limitations of time and resources preclude the direct measurement, by questionnaires or interviews, of shared aspirations with respect to education. We have therefore found it necessary to select certain variables that may be related to aspiration levels. But the value of this type of reasoning rests only in the proven predictive power of the variables selected; and even if their predictive power proves high, their quality as indices of aspiration levels cannot be finally known, as the following discussion indicates.

Since educated people are presumably acquainted with the desirable results of a good education and desire these outcomes for their children, the level of education in the adult community provides one index of the shared aspiration for education.

Another lies in the level of unemployment, but this can influence aspiration in either direction. In a community with a high level of unemployment, parents may wish to provide better educational opportunities for their children to prevent their having to undergo similar deprivations. Or there may be a lethargy associated with chronic conditions of unemployment that results in reduced expenditure levels. Factors of race may similarly be influential but ambiguous.

The division of population between urban and rural areas will often affect aspiration if urban residents tend to be more aware of the benefits of education. Furthermore, fewer rural pupils proceed to secondary schools, owing to (a) dissatisfaction with the curriculum provided in small high schools, (b) distance from high schools, and (c) the family's reluctance to forgo the additional earnings that the student's services on the farm would provide.

Finally the number of children attending non-public schools may affect both the level of aspiration and the ability to support public schools. In the first place, where private and parochial school attendance rates are high, there should be more resources available for support of the public schools, since they must educate a smaller number of children with undiminished resources. However, in these cases, there may also be less interest and less voter support for the public schools.

3. Measures of Institutional Factors

While it is difficult to categorize and quantify the relevant aspect of the institutional framework of decision-making, Chapter Six discusses one approach to a classification of possible decision-making arrangements. As perhaps the most significant aspect of this categorization, fiscal independence was taken as a measure of the responsiveness of expenditures to the wishes of the citizens. We classified a district as fiscally independent if the final approval of the school budget is made by the voters directly or by the school board. Districts in which the budget is approved by some other governmental unit were classified as fiscally dependent. As Chapter Six points out, this is an oversimplification.

This dichotomy is not completely satisfactory for our purposes, since there are many other external influences and limitations on the ability of the citizens of a school district to establish their preferred level of educational expenditures. Since many of these result from statutory requirements and limitations at the state level, and since it is difficult to choose a priori the most significant of them and to rank them on a relevant quantitative scale, we took the state in which a district is located as one of the factors determining the level of its educational expenditures. Naturally, any results from such an analysis must be taken as a description rather than an explanation of the observed interstate patterns of expenditure.

Our preconceptions as to the effects of institutional factors do not take the same form as those regarding wealth and aspiration. There we could say that an increase in wealth or aspiration, other things held constant, would be associated with an increase in the level of expenditure. Here we would expect a relaxing of institutional constraints to be associated with a heightening of the relationship between our measures of wealth and aspiration and our measure of expenditure.

Because of this difference, we used several approaches to the problem. First, we computed a separate regression for each fiscal category within each state where there were a sufficiently large number of observations to permit meaningful results. Second, for each state containing both types of districts, we computed a regression using a dummy variable[4] for fiscal independence. Third, for the entire sample we computed a regression using a set of dummy variables for the state and a dummy variable for fiscal independence. Finally, we computed a regression using the level of state support of education for the state and a dummy variable for fiscal independence.

The number of districts in each category and the regressions which were computed are given in Table 8.

Table 8

Classification of districts used in regressions

State	Number of Districts		
	Dependent	Independent	Total[a]
California	0	52[b]	52
Massachusetts	39[b]	44[b]	83[c]
Nebraska	0	17[b]	17
New Hampshire	7	5	12
New Jersey	37[b]	71[b]	108[c]
New Mexico	23[b]	0	23
New York	6	169	175[c]
Oregon	0	26[b]	26
Washington	0	47[b]	47
Wisconsin	34	12	46[c]
Total	146	443	589[de]

[a] The number of districts used in the regressions differs from the numbers analyzed in Chapter Two (Table 3) by the omission of those districts which could not be identified with an urban place of population of 2,500 or more.

[b] Regressions on wealth and aspiration variables.

[c] Regressions on wealth, aspiration, and fiscal independence.

[d] Regression on wealth, aspiration, fiscal independence, and state (dummy variables).

[e] Regression on wealth, aspiration, fiscal independence, and state (level of state support).

---

[4] For an explanation of the concept and use of dummy variables see Appendix B.

4. Variables

The definitions of the variables and the sources of the data used in the regressions are as follows:

Dependent variable:

Y = Current Educational Expenditure per Pupil in Average Daily Attendance, 1958-59, in dollars; computed from data obtained from publications or records of state departments of education as outlined in Appendix A.

Independent variable:

Measures of wealth:

X_1 = Equalized Property Value per Resident Pupil in Average Daily Attendance, 1958-59, in dollars. Equalized property value reported by state departments of education or taxation, or computed from assessed valuation by applying correlation factors furnished by these agencies. Resident ADA obtained from publications or records of state departments of education.

X_2 = Median Family Income, 1960, in dollars. U.S. Census publications.[5/]

X_3 = Percent of Occupied Housing Occupied by Owners, 1960. U. S. Census publications.

[5/] For places of population 2,500 - 10,000 with median family income greater than $10,000, median family income is not given. Median family income was estimated from the percentage of families with income greater than $10,000. The formula used was $X_2 = 10{,}000 + 216.61\ (Z - 50)$. This formula was obtained by a least squares fit of the form $X_2 = 10{,}000 + b(Z-50)$ to data on median family income and percent of families with income greater than $10,000 for places of population greater than 10,000 with $50 < Z < 80$ in the ten states.

Measures of aspiration:

X_4 = Median Years of Schooling for Population over age 25, 1960. U.S. Census publications.

X_5 = Percent of Labor Force Unemployed, 1960. U.S. Census publications.

X_6 = Percent of Population Non-White, 1960. U.S. Census publications.

X_7 = Percent of County Population Living on Rural Farms, 1960. U.S. Census publications.

X_8 = Percent of Elementary School Children Attending Private Schools, 1960. U.S. Census publications.

Measures of institutional factors:

X_9 = Percent of Total School Revenue from State Sources, 1957-58. NEA, Rankings of the States, 1959, Table 31.

X_{10} - X_{18} = Dummy Variables for State.

X_{19} = Dummy Variable for Fiscal Independence, 1957-58. (See pp. 74, 75)

The values assigned to variables X_9 to X_{18} are shown in Table 9.

TABLE 9

Values assigned to variables X_9 - X_{18}

State	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}
California	39.1	0	0	0	0	0	0	0	0	0
Massachusetts	26.9	1	0	0	0	0	0	0	0	0
Nebraska	6.9	0	1	0	0	0	0	0	0	0
New Hampshire	9.6	0	0	1	0	0	0	0	0	0
New Jersey	26.4	0	0	0	1	0	0	0	0	0
New Mexico	77.2	0	0	0	0	1	0	0	0	0
New York	39.6	0	0	0	0	0	1	0	0	0
Oregon	29.3	0	0	0	0	0	0	1	0	0
Washington	50.2	0	0	0	0	0	0	0	1	0
Wisconsin	21.4	0	0	0	0	0	0	0	0	1

X_{19} = 0 for fiscally dependent districts
X_{19} = 1 for fiscally independent districts

5. Empirical Findings

Our empirical findings are summarized in the following equations; standard errors of the regression coefficients are shown in parentheses.

1. California

$$
\begin{array}{lllll}
Y = 275.5 + .001897X_1 & + .00315X_2 & - .499X_3 & & \\
 (.000205) & (.00394) & (.488) & & \\
+ 7.25X_4 + 3.30X_5 & - .18X_6 & - 4.68X_7 & - 3.302X_8 & \\
 (8.48) \quad (3.65) & (.82) & (1.79) & (1.100) &
\end{array}
$$

$N = 52 \qquad R = .887 \qquad R^2 = .787$

2. Massachusetts, all districts

$$
\begin{array}{llllll}
Y = 35.1 + .001773X_1 & + .02309X_2 & - 1.601X_3 & & & \\
 (.000477) & (.00526) & (.323) & & & \\
+ 17.50X_4 + 1.52X_5 & - .29X_6 & - .04X_7 & + .430X_8 & - 10.04X_{19} & \\
 (4.90) \quad (2.69) & (2.35) & (3.86) & (.376) & (7.90) &
\end{array}
$$

$N = 83 \qquad R = .840 \qquad R^2 = .706$

3. Massachusetts, dependent districts

$$
\begin{array}{lllll}
Y = 8.5 + .002198X_1 & + .03449X_2 & - 1.469X_3 & & \\
 (.000910) & (.01095) & (.481) & & \\
+ 9.27X_4 + 6.26X_5 & + .49X_6 & + 4.63X_7 & + .511X_8 & \\
 (7.18) \quad (3.87) & (2.36) & (6.57) & (.609) &
\end{array}
$$

$N = 39 \qquad R = .827 \qquad R^2 = .683$

4. Massachusetts, independent districts

$$
\begin{array}{lllll}
Y = -22.6 + .001804X_1 & + .01709X_2 & - 1.652X_3 & & \\
 (.000686) & (.00727) & (.474) & & \\
+ 25.91X_4 + .35X_5 & - 2.78X_6 & - 2.50X_7 & + .431X_8 & \\
 (8.29) \quad (4.25) & (12.36) & (5.17) & (.592) &
\end{array}
$$

$N = 44 \qquad R = .870 \qquad R^2 = .757$

5. Nebraska

$$Y = 2.2 + \underset{(.002713)}{.003481X_1} - \underset{(.03573)}{.05759X_2} + \underset{(4.319)}{4.647X_3}$$

$$+ \underset{(29.31)}{26.95X_4} - \underset{(10.16)}{6.76X_5} + \underset{(5.76)}{4.68X_6} - \underset{(1.94)}{2.26X_7} - \underset{(1.639)}{3.259X_8}$$

$N = 17$ $\quad R = .753 \quad$ $R^2 = .567$

6. New Jersey, all districts

$$Y = 480.8 + \underset{(.000337)}{.000940X_1} + \underset{(.00492)}{.02367X_2} - \underset{(.323)}{2.519X_3}$$

$$- \underset{(6.28)}{4.18X_4} - \underset{(4.26)}{10.19X_5} + \underset{(.62)}{1.09X_6} - \underset{(3.30)}{4.61X_7} + \underset{(.600)}{.010X_8} - \underset{(12.21)}{3.27X_{19}}$$

$N = 108$ $\quad R = .796 \quad$ $R^2 = .634$

7. New Jersey, dependent districts

$$Y = 745.9 + \underset{(.000383)}{.001136X_1} + \underset{(.01012)}{.03446X_2} - \underset{(.436)}{3.097X_3}$$

$$- \underset{(10.88)}{28.33X_4} - \underset{(6.43)}{23.26X_5} + \underset{(.71)}{2.08X_6} - \underset{(4.49)}{6.60X_7} - \underset{(.838)}{.459X_8}$$

$N = 37$ $\quad R = .902 \quad$ $R^2 = .814$

8. New Jersey, independent districts

$$Y = 345.0 + \underset{(.000774)}{.002115X_1} + \underset{(.00632)}{.01806X_2} - \underset{(.599)}{1.440X_3}$$

$$- \underset{(7.63)}{.56X_4} - \underset{(5.65)}{6.07X_5} + \underset{(1.08)}{1.33X_6} + \underset{(4.78)}{.27X_7} - \underset{(.832)}{.023X_8}$$

$N = 71$ $\quad R = .749 \quad$ $R^2 = .561$

9. New Mexico

$$Y = 682.5 + \underset{(.000731)}{.001525X_1} + \underset{(.01088)}{.01480X_2} - \underset{(.704)}{1.977X_3}$$

$$- \underset{(13.12)}{28.47X_4} - \underset{(4.12)}{2.81X_5} - \underset{(2.35)}{.41X_6} - \underset{(1.37)}{.69X_7} - \underset{(1.212)}{.227X_8}$$

$N = 23$ $\quad R = .806 \quad$ $R^2 = .649$

10. New York

$$Y = 178.8 + \underset{(.000668)}{.004473X_1} + \underset{(.00366)}{.01722X_2} - \underset{(.460)}{.748X_3}$$

$$+ \underset{(6.64)}{10.01X_4} - \underset{(2.73)}{1.66X_5} + \underset{(1.30)}{2.17X_6} - \underset{(1.12)}{2.27X_7} - \underset{(.532)}{1.047X_8} + \underset{(27.27)}{110.65X_{19}}$$

$N = 175$ $R = .804$ $R^2 = .646$

11. Oregon

$$Y = 80.4 + \underset{(.001470)}{.000038X_1} + \underset{(.02912)}{.05463X_2} + \underset{(1.349)}{2.051X_3}$$

$$- \underset{(14.27)}{6.96X_4} - \underset{(3.84)}{8.65X_5} + \underset{(5.09)}{1.13X_6} - \underset{(1.10)}{1.76X_7} - \underset{(1.464)}{.827X_8}$$

$N = 26$ $R = .746$ $R^2 = .557$

12. Washington

$$Y = 347.1 + \underset{(.000680)}{.000137X_1} + \underset{(.00900)}{.01144X_2} - \underset{(.888)}{.723X_3}$$

$$+ \underset{(7.89)}{.00X_4} - \underset{(2.27)}{.28X_5} + \underset{(2.58)}{2.17X_6} + \underset{(1.01)}{.03X_7} - \underset{(1.007)}{.256X_8}$$

$N = 47$ $R = .379$ $R^2 = .143$

13. Wisconsin

$$Y = 485.8 + \underset{(.000947)}{.001005X_1} + \underset{(.01083)}{.03123X_2} - \underset{(.970)}{1.293X_3}$$

$$- \underset{(8.84)}{17.36X_4} - \underset{(4.15)}{1.15X_5} - \underset{(3.96)}{10.93X_6} - \underset{(.87)}{1.40X_7} - \underset{(.564)}{.387X_8} + \underset{(15.65)}{40.25X_{19}}$$

$N = 46$ $R = .839$ $R^2 = .704$

14. Ten States, dummy variables

$$Y = 277.9 + \underset{(.000189)}{.001761X_1} + \underset{(.00209)}{.02199X_2} - \underset{(.193)}{1.401X_3}$$

$$- \underset{(2.99)}{1.13X_4} - \underset{(1.27)}{2.24X_5} + \underset{(.45)}{1.15X_6} - \underset{(.44)}{1.32X_7} - \underset{(.248)}{.472X_8}$$

$$- \underset{(10.8)}{11.6X_{10}} - \underset{(16.5)}{41.6X_{11}} - \underset{(17.9)}{41.7X_{12}} + \underset{(10.3)}{51.4X_{13}} + \underset{(15.3)}{14.0X_{14}}$$

$$+ \underset{(9.6)}{183.7X_{15}} + \underset{(13.2)}{64.8X_{16}} + \underset{(11.1)}{46.5X_{17}} + \underset{(15.0)}{73.4X_{18}} + \underset{(7.47)}{8.27X_{19}}$$

$N = 589$ $\quad$ $R = .880$ $\quad$ $R^2 = .774$

15. Ten states, level of state support

$$Y = 290.1 + \underset{(.000266)}{.000290X_1} + \underset{(.00314)}{.03627X_2} - \underset{(.289)}{1.534X_3}$$

$$- \underset{(4.30)}{17.04X_4} - \underset{(1.91)}{3.13X_5} + \underset{(.66)}{2.78X_6} + \underset{(.55)}{.68X_7}$$

$$+ \underset{(.349)}{1.798X_8} + \underset{(.292)}{2.427X_9} + \underset{(9.01)}{80.32X_{19}}$$

$N = 589$ $\quad$ $R = .655$ $\quad$ $R^2 = .429$

Partial correlation coefficients are shown in Table 10.

Tests of alternative null hypotheses regarding the coefficient of a particular independent variable in a particular regression are presented graphically in Charts 1 - 8. Each vertical bar represents a 95 percent confidence interval. If it intersects the horizontal line corresponding to a particular null hypothesis, then that hypothesis is not rejected at the 5 percent level. The solid line corresponds to the hypothesis that the true value of the coefficient is zero; the broken line to the hypothesis that it is equal to the value estimated for the ten-state sample using dummy variables; the dotted line to the estimate

TABLE 10

Partial Correlation Coefficients

	X_1 EPV	X_2 MFI	X_3 %OOH	X_4 MYS	X_5 %U	X_6 %NW	X_7 %RF	X_8 %PS	X_9 %SS	X_{19} FI
California	.816	.121	-.154	.129	.137	-.033	-.371	-.416		
Massachusetts	.399	.457	-.502	.386	.066	-.014	-.001	.133		-.147
" Dependent Dist.	.404	.499	-.487	.230	.283	.038	.128	.151		
" Independent Dist.	.406	.369	-.507	.467	.014	-.038	-.082	.122		
Nebraska	.413	-.495	.356	.309	-.229	.276	-.382	-.575		
New Jersey	.271	.437	-.619	-.067	-.235	.176	-.139	.002		-.027
" Dependent Dist.	.489	.541	-.802	-.442	-.564	.483	-.268	-.103		
" Independent Dist.	.328	.341	-.292	-.009	-.135	.154	.007	-.003		
New Mexico	.487	.342	-.600	-.502	-.179	-.047	-.133	-.050		
New York	.462	.344	-.125	.117	-.047	.129	-.156	-.152		.301
Oregon	.006	.414	.346	-.117	-.479	.054	-.360	-.136		
Washington	.033	.202	-.131	.000	-.020	.135	.004	-.041		
Wisconsin	.174	.433	-.217	-.311	-.046	-.418	-.260	-.114		.394
Ten States - d.v.	.364	.403	-.291	-.016	-.074	.107	-.125	-.079		.046
Ten States - s.s.	.045	.433	-.215	-.163	-.068	.174	.051	.210	.327	.348

for the ten-state sample using the level of state supports; and the +++ line to the estimate for the state as a whole (both dependent and independent districts).

Let us consider each variable in turn.

X_1 Property Value. (Chart 13)

We found positive coefficients in all 15 samples. These coefficients were significantly different from zero in 9 samples at the 5 percent level, in 7 at the 1 percent level. Hence our expectation of a positive influence for property values on educational expenditures is confirmed. In Massachusetts and New Jersey, there are no significant differences between the effects of this variable in dependent and independent districts. Out of 9 statewide regressions, 3 coefficients are significantly different from that estimated in equation 14, and 3 are significantly different from that in equation 15.

X_2 Median Family Income. (Chart 14)

We found positive coefficients in all samples except Nebraska, which, however, was not significantly negative at the 5 percent level. Ten of the 15 samples had positive coefficients significantly different from zero at the 5 percent level, 9 at the 1 percent level. This confirms our expectation that median family income has a positive influence on expenditures. The effects of income in dependent and independent districts do not differ significantly from those in all districts of Massachusetts and New Jersey. The hypothesis that the true coefficient is as estimated in equation 14 is rejected only in California. That it is as estimated by equation 15 is rejected in six out of nine states.

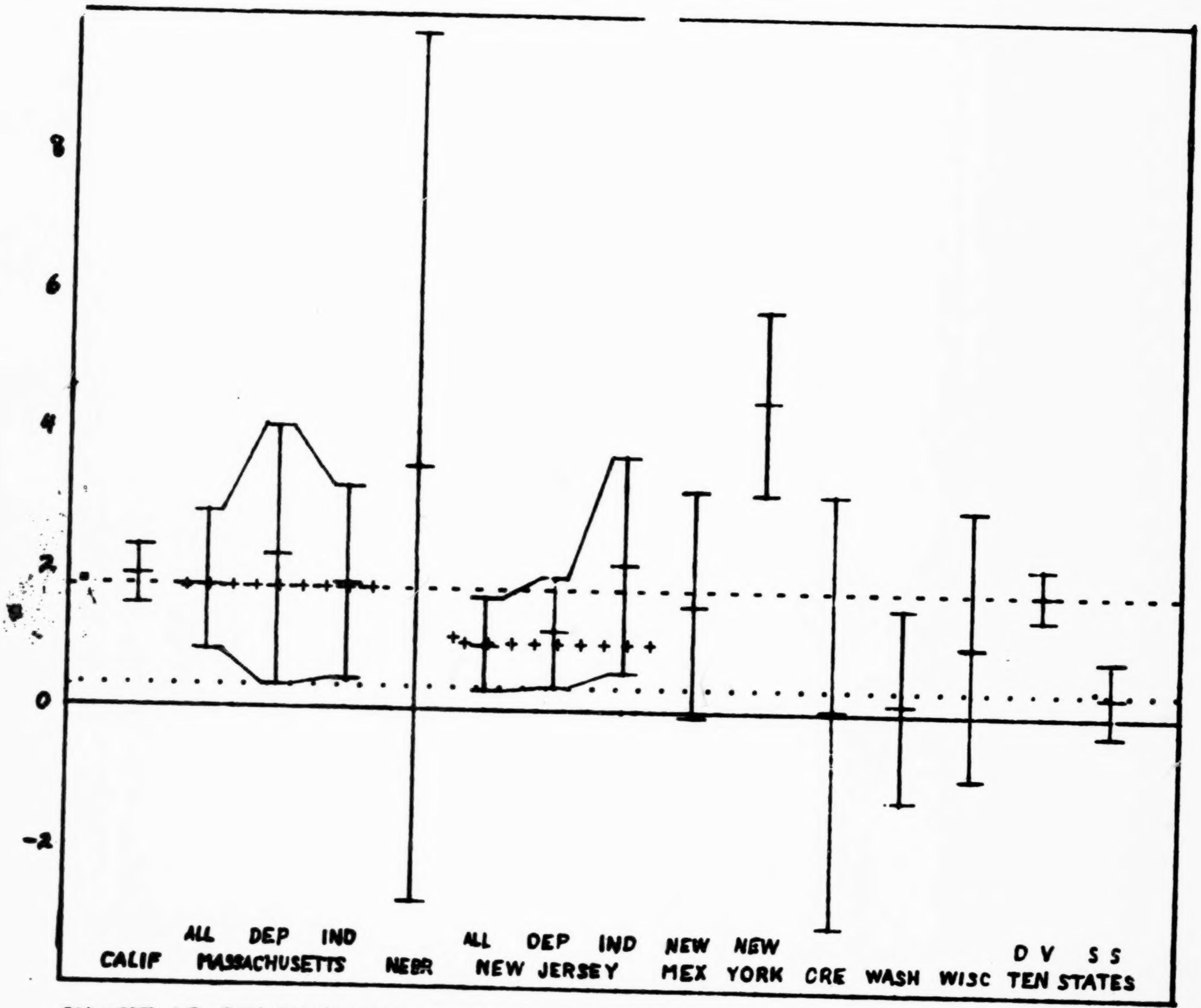
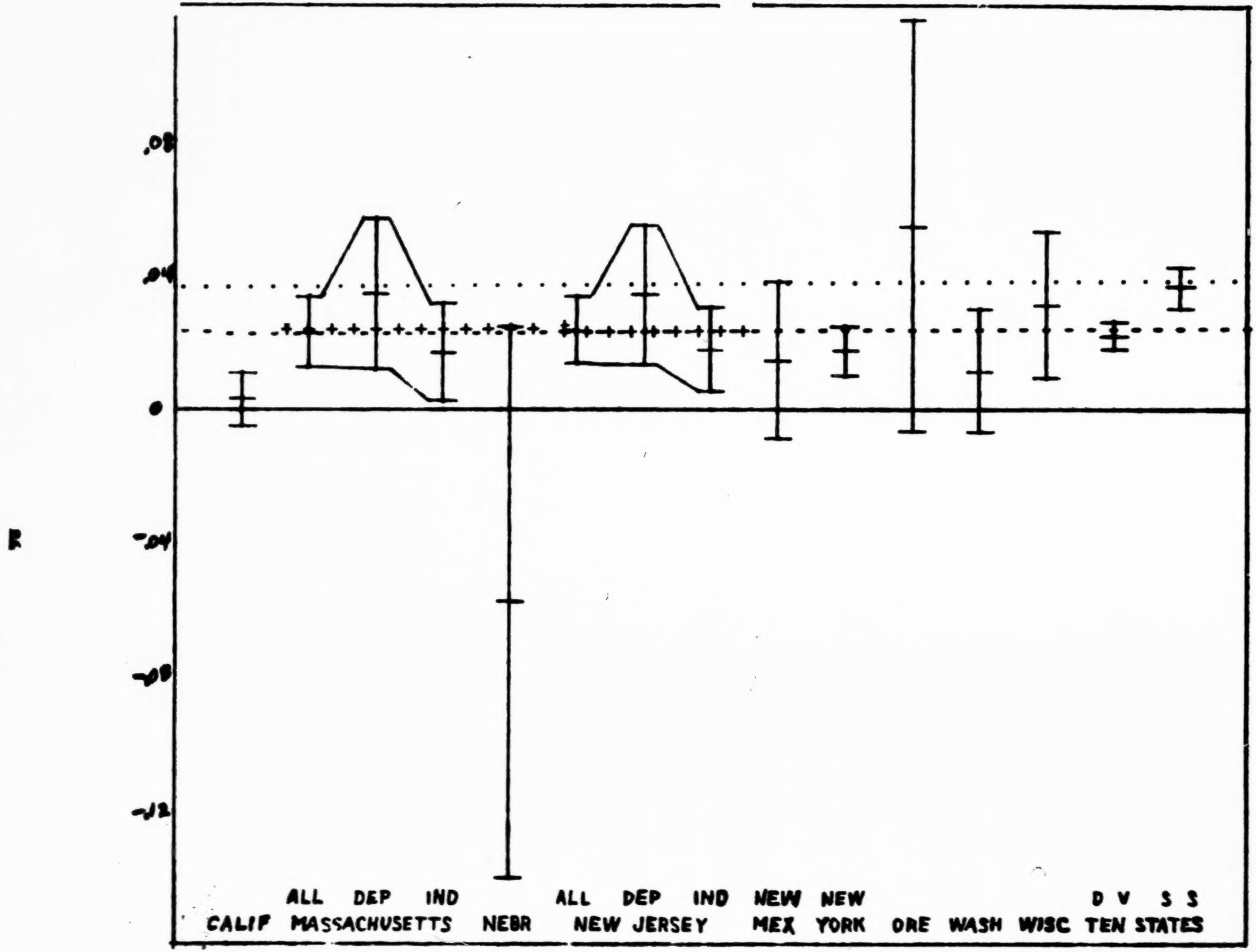


CHART 13 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENT OF EQUALIZED PROPERTY VALUE PER RESIDENT ADA


R
.08
.04
0
-.04
-.08
-.12
ALL DEP IND
CALIF MASSACHUSETTS
NEBR
ALL DEP IND
NEW JERSEY
NEW MEX
NEW YORK
ORE
WASH
WISC
D V S S
TEN STATES

X_3 Percent of Occupied Housing Owner-Occupied. (Chart 15)

We found negative coefficients in all samples except Nebraska and Oregon, neither of which was significantly different from zero. There were 9 negative coefficients significantly different from zero at the 5 percent level, 8 at the 1 percent level. Our expectation of negative coefficients is confirmed. For this variable also, the coefficients of dependent and independent districts do not differ significantly from those estimated for all districts of the state. The hypothesis of equation 14 is rejected in two states, that of equation 15 in three.

X_4 Median Years of Schooling. (Chart 16)

We found ten coefficients not significantly different from zero at the 5 percent level. Of the 5 significant coefficients, 2 were positive and 3 were negative. Both of the positive and one of the negative coefficients were also significant at the 1 percent level. These results do not support our expectation of a positive influence.[6] The coefficient in the dependent districts of New Jersey is significantly lower than that estimated for all New Jersey districts at the 5 percent level. The coefficient estimated in equation 14 is rejected only in Massachusetts; that of equation 15 is rejected in five states at the 5 percent level.

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[6] The high intercorrelation of median years of schooling with median family income (.7) may in large part account for the insignificant effects of schooling when income is held constant.

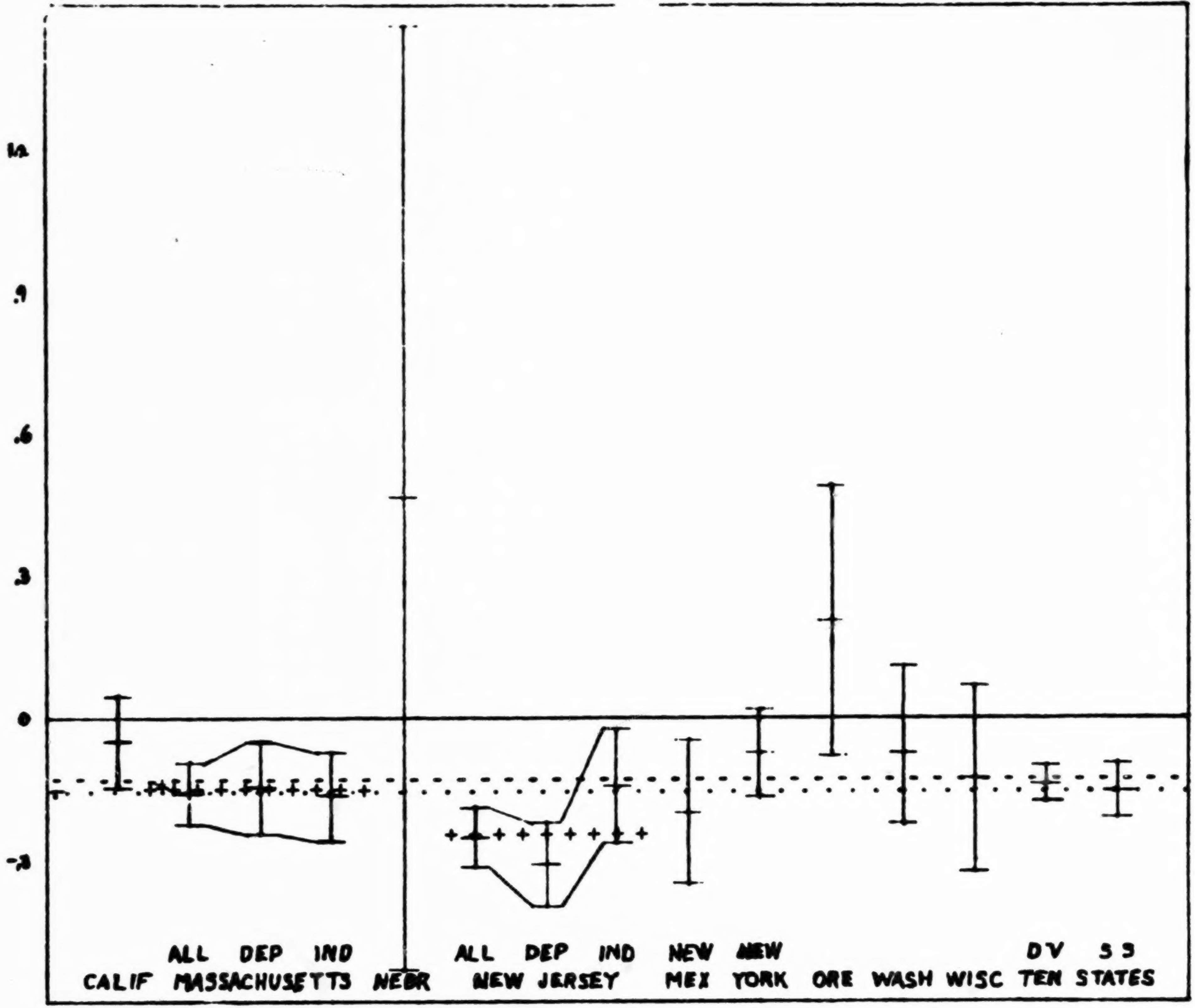

CHART 15 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENT OF % OF OCCUPIED HOUSING OWNER OCCUPIED

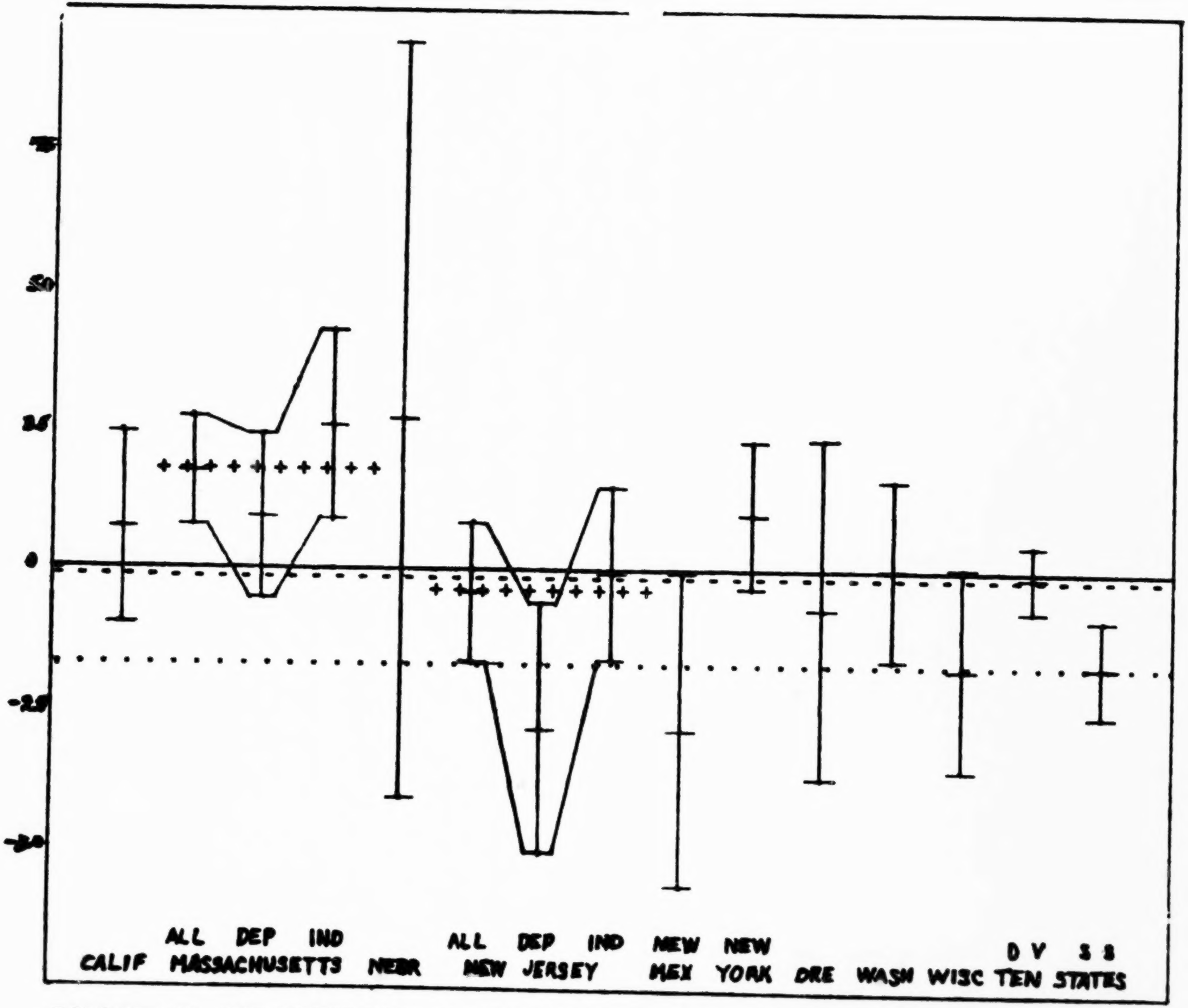

CHART 16 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENTS OF MEDIAN YEARS OF SCHOOL

X_5 Percent of Labor Force Unemployed. (Chart 17)

We found only three samples significantly different from zero at the 5 percent level, all negative. Only one was significant at the 1 percent level. We may conclude that the effect of this variable is small with perhaps a slight negative tendency. None of the dependent or independent district sub-samples was significantly different from the sample of all districts in the state. The hypotheses of equations 14 and 15 are not rejected in any state.

X_6 Percent of Population Non-White. (Chart 18)

Only four coefficients, three positive and one negative, were significantly different from zero at the 5 percent level. There were two positive and one negative coefficients significant at the 1 percent level. We may conclude that the effect of this variable is small with a slight positive tendency. In Massachusetts and New Jersey, we find no significant differences between dependent and independent districts. The hypothesis of equation 14 is rejected only in Wisconsin; that of equation 15 is rejected in three states.

X_7 Percent of County Population Living on Rural Farms. (Chart 19)

We found three negative coefficients significantly different from zero at the 5 percent level, one at the 1 percent level. Our expectation of a negative influence is not confirmed, although there is a tendency in the expected direction. There were no significant differences between dependent and independent districts. The hypothesis of equation 14 is not rejected in any state; that of equation 15 is rejected in four states.

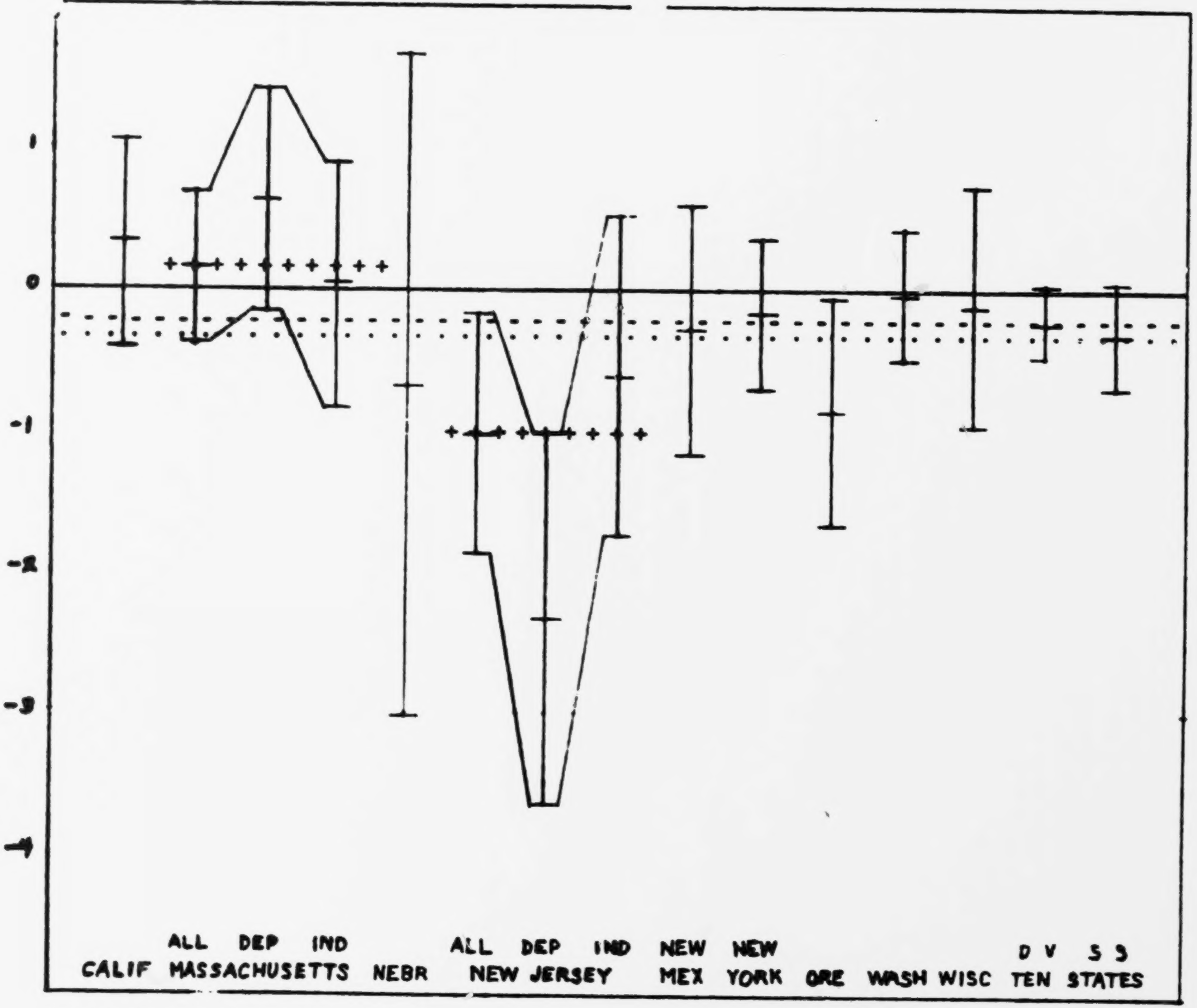

CHART 17 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENTS OF % OF LABOR FORCE UNEMPLOYED

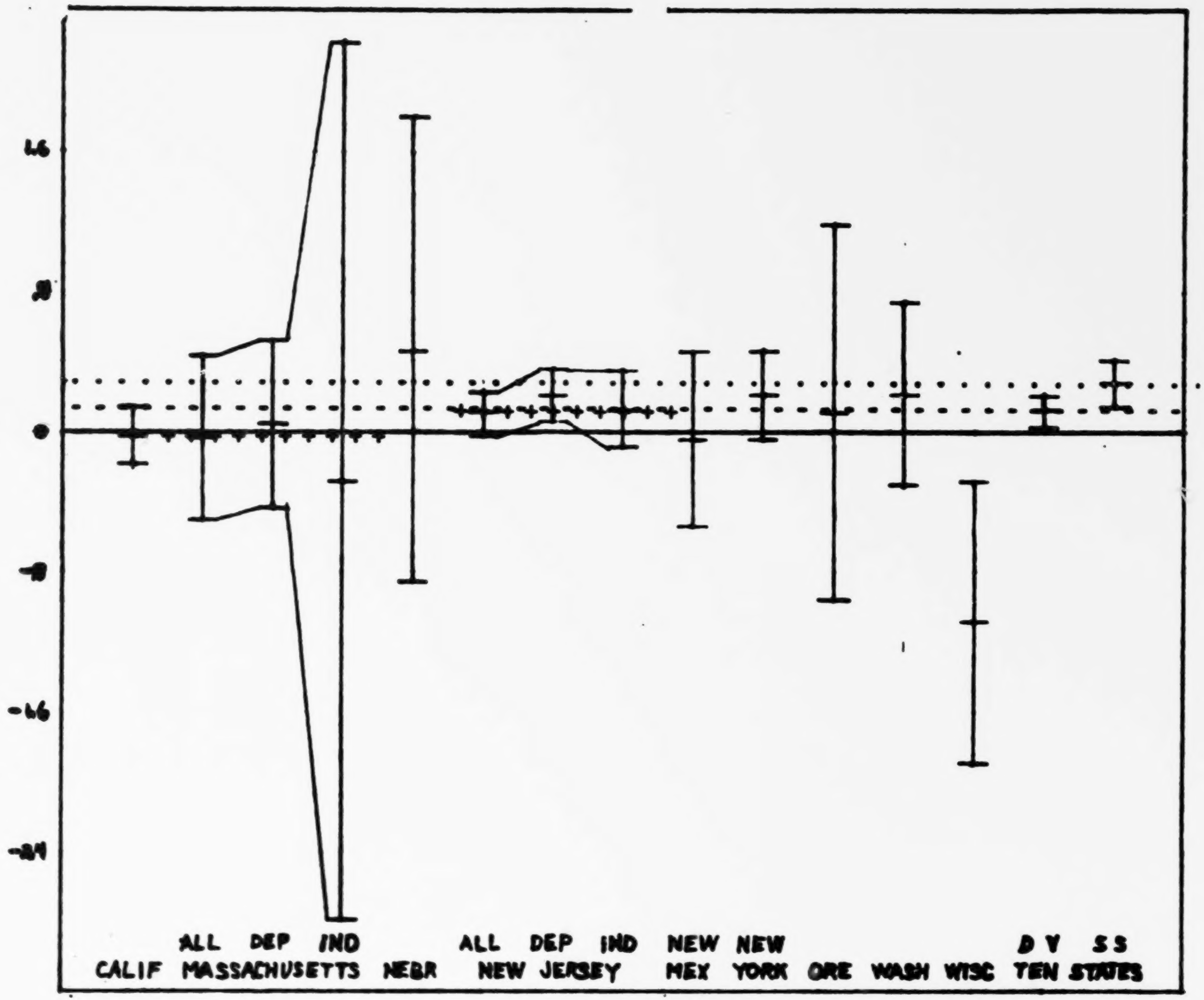

CHART 18 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENTS OF % OF POPULATION NON-WHITE

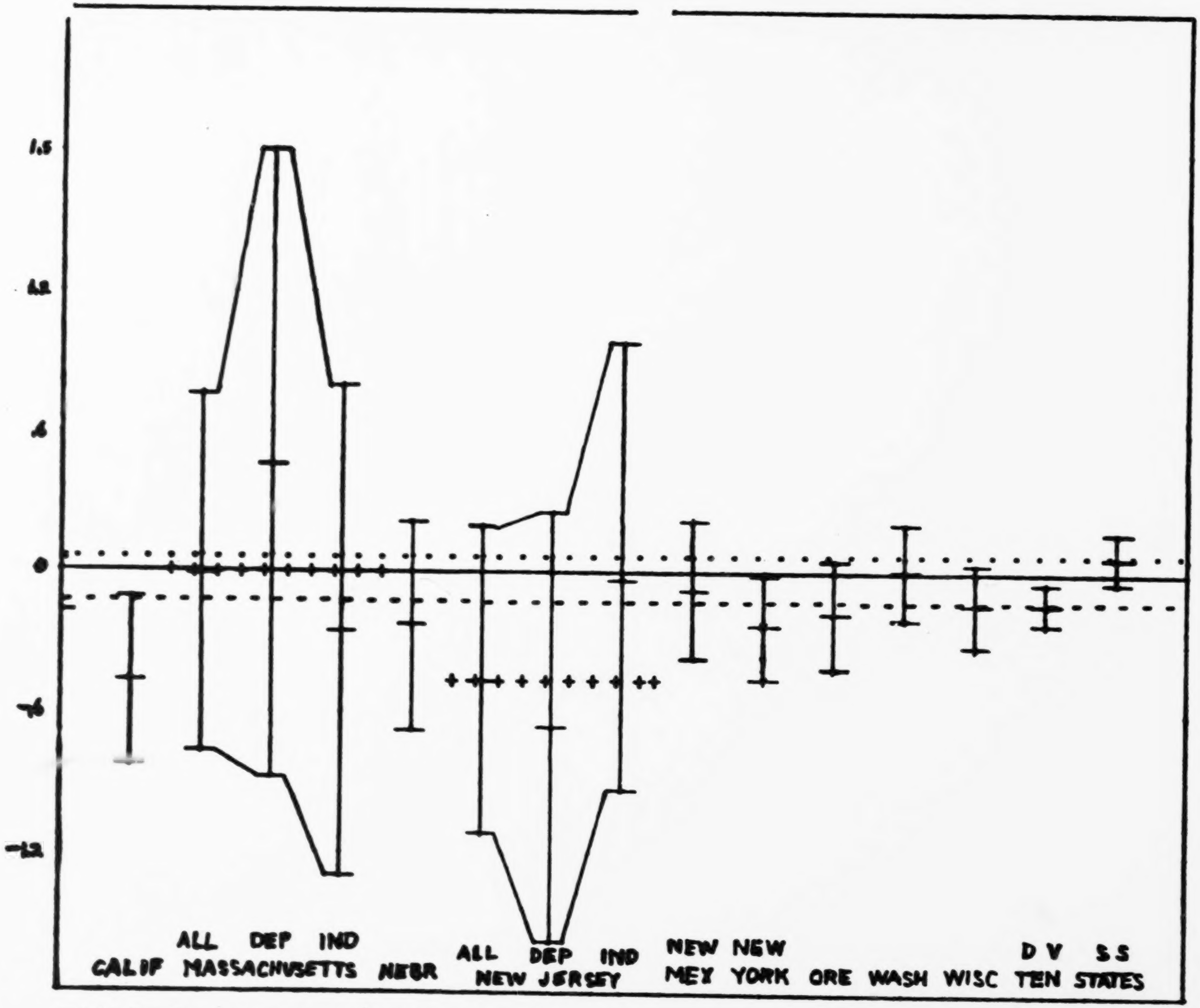

CHART 17 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENTS OF % OF COUNTY POPULATION LIVING ON RURAL FARMS

X_8 Percent of Elementary School Children in Private Schools. (Chart 20)

There were two coefficients significant at the 5 percent level, one positive and the other negative. Both were also significant at the 1 percent level. We may conclude that the expected contradictory effects seem roughly to cancel out. We found no significant differences between dependent and independent districts in Massachusetts and New Jersey. The hypothesis of equation 14 is rejected in two states; that of equation 15 is rejected in seven.[7]

X_9 Percent of Total School Revenue from State Sources.

This variable was used only in equation 15 where its coefficient is significantly positive at the 1 percent level.

X_{10} to X_{18} Dummy Variables for State.

These variables were used only in equation 16. Because of the structure of the variables, a statistically significant coefficient indicates that the expected expenditure of a district in the corresponding state is significantly different from that of a similar district in California. For a more meaningful comparison, we calculated 95 percent confidence intervals for the expected value of expenditures in a typical district under various assumptions of which state the district is located in and whether it is fiscally dependent or independent. Our "typical" district was defined as having the following characteristics - the means of X_1 - X_8 in the ten-state sample.

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[7] For parallel findings on this and other variables see Jerry Miner's forthcoming publication, Social and Economic Factors in Spending for Public Education, Syracuse Press, June, 1963.

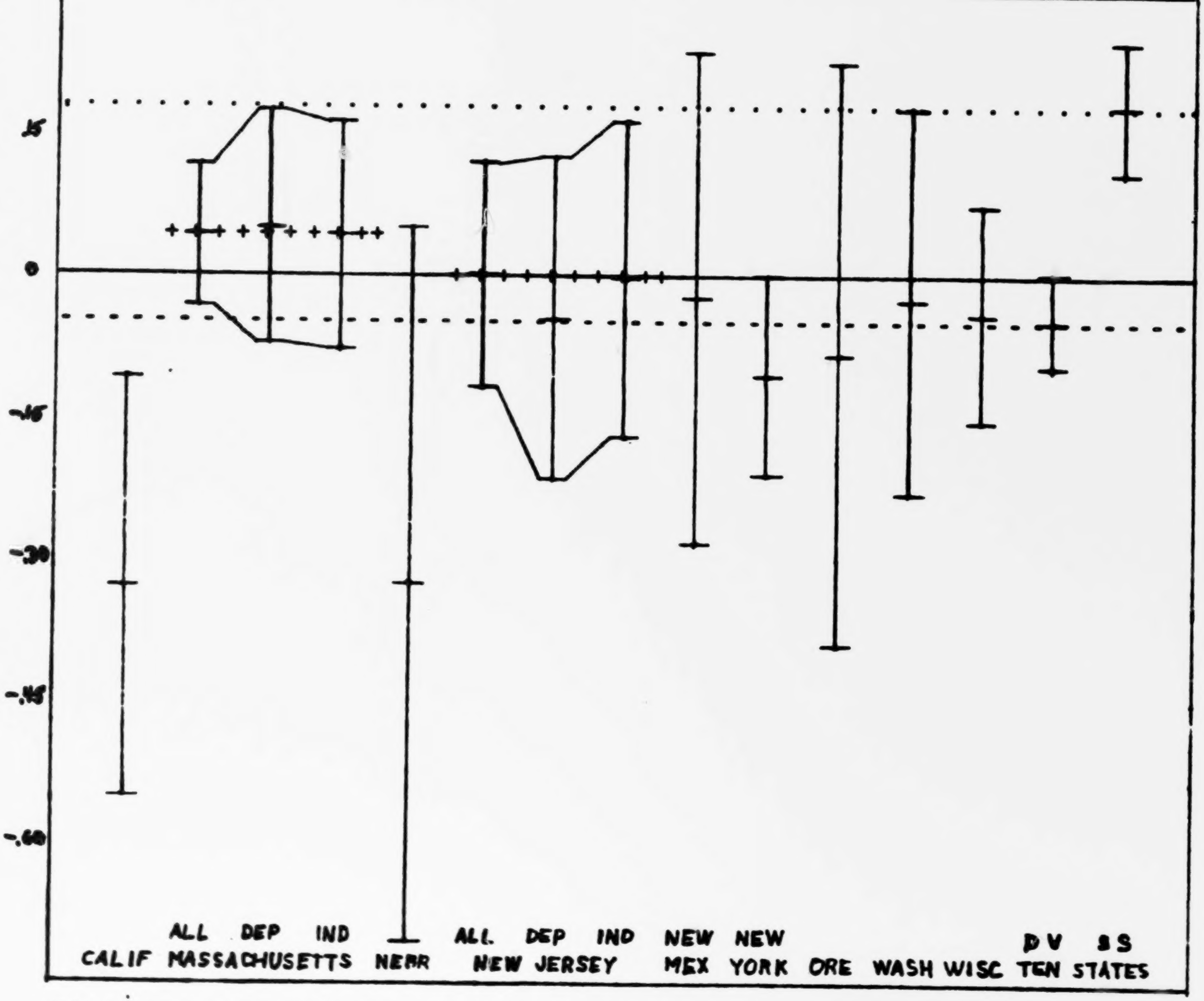

CHART 20 95% CONFIDENCE INTERVALS FOR REGRESSION COEFFICIENTS OF % OF ELEMENTARY SCHOOL CHILDREN IN PRIVATE SCHOOLS

$X_1^* = \$27,300$ $\qquad X_5^* = 4.8\%$

$X_2^* = \$\ 6,714$ $\qquad X_6^* = 3.1\%$

$X_3^* = 64.3\%$ $\qquad X_7^* = 4.9\%$

$X_4^* = 11.3$ years $\qquad X_8^* = 20.1\%$

The twenty-point estimates and their 95 percent confidence intervals are shown in Chart 21 and Table 11.

TABLE 11

95 Percent confidence intervals

(Expected value of current expenditure per ADA
for "typical" district in different states)

	Fiscally Dependent			Fiscally Independent		
		Confidence Interval			Confidence Interval	
State	Point Estimate	Lower Limit	Upper Limit	Point Estimate	Lower Limit	Upper Limit
California	348	326	369	356	340	372
Massachusetts	336	322	351	344	331	358
Nebraska	306	276	336	314	287	341
New Hampshire	306	276	337	314	284	345
New Jersey	399	383	415	407	396	419
New Mexico	362	340	383	370	343	397
New York	531	515	548	540	532	548
Oregon	413	388	437	421	400	442
Washington	394	373	415	403	386	419
Wisconsin	421	401	441	429	407	451

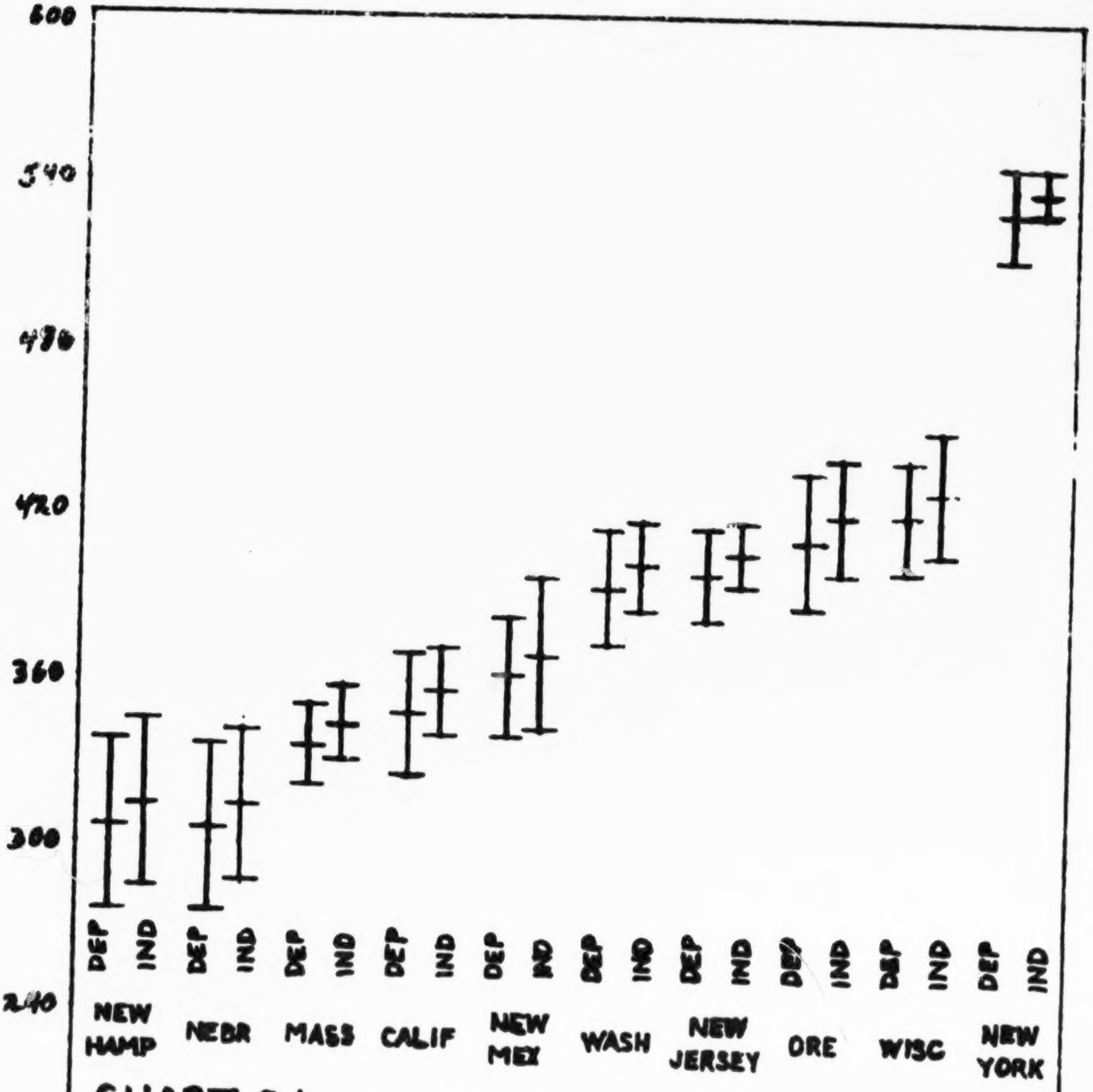

CHART 21 95% CONFIDENCE INTERVALS
EXPECTED VALUE OF CURRENT EXPENDITURES PER ADA
FOR "TYPICAL" DISTRICT IN DIFFERENT STATES

TYPICAL DISTRICT DEFINED BY THE FOLLOWING CHARACTERISTICS:

EQUALIZED PROPERTY VALUE PER RESIDENT ADA	$ 27,300
MEDIAN FAMILY INCOME	$ 6714
% OF OCCUPIED HOUSING OWNER OCCUPIED	64.2
MEDIAN YEARS OF SCHOOL	11.3
% OF LABOR FORCE UNEMPLOYED	4.8
% OF POPULATION NON-WHITE	3.1
% OF COUNTY POPULATION LIVING ON RURAL FARMS	4.9
% OF ELEMENTARY SCHOOL CHILDREN IN PRIVATE SCHOOLS	20.1

X_{19} Dummy Variable for Fiscal Independence.

This variable was used in the regressions for Massachusetts, New Jersey, New York, and Wisconsin, and in the two ten-state regressions. It has negative but nonsignificant coefficiants in Massachusetts and New Jersey. In New York the coefficient was significantly positive at the 1 percent level. In Wisconsin it was significantly positive at the 5 percent level. In the ten-state regressions it was positive and significant at the 1 percent level when we used state support (X_9), but not significant when instead we used dummy variables (X_{10} - X_{18}). The interpretati[illegible] of these results is hindered by other factors. In New York the six dependent districts are located in the six largest cities.[8] There may be similar factors distorting the picture in other states as well.

We also tested the null hypothesis that there was no relationship between the independent variables and expenditures. This hypothesis was rejected both at the 5 percent level and at the 1 percent level in every regression except Nebraska and Washington. These exceptions may be explained by the small sample size in Nebraska (N = 17) and by the slight relationship between expenditures and our independent variables in Washington (R = .379).

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[8] Hanson explored the residual variation remaining in expenditures after removal of the effects of variables 1 through 8 and found evidences of economies of scale. His findings suggest that if effects of economies of scale were partialed out, the amount of variation explained by the dummy variable would have been reduced. Nels W. Hanson, "Economy of Scale in Education: An Analysis of the Relationship Between District Size and Unit Costs in the Public Schools," Unpublished Ed.D Dissertation, Stanford University, Stanford, 1963.

Summary and conclusions

The pattern of the relationship between expenditures and our measures of wealth and aspiration seems to vary significantly from state to state, not only in the level of expenditures but also in the strength of the effects of the different explanatory variables.

Educational expenditures are significantly related to wealth, as measured by equalized valuation and median family income, in California, Massachusetts, New Jersey, New York, and Wisconsin.

The effects of our measures of aspiration are weaker and less consistent from state to state. Perhaps their major value is that they enable us to consider the relationship between "wealth" variables and expenditures, with some other variables held constant.

The differences in the level of expenditures from state to state after the effects of our measures of wealth and aspiration have been removed are striking. There are four distinct plateaus, with New Hampshire and Nebraska on the lowest; Massachusetts, California, and New Mexico on the second; Washington, New Jersey, Oregon, and Wisconsin on the third; and New York far above the rest. This intriguing pattern has been further studied, and an attempt to explain it is given in Chapter Two, pp. 30-38.

The effects of a district's fiscal independence on the level of expenditures and on the pattern of the relationship between expenditures and our independent variables seem less significant than the similar effects of the state in which the district is located. In the two states for which we had enough observations to measure separate relationships for dependent and independent districts, the coefficients did not seem to differ greatly or in any consistent pattern. When we used independence as a separate variable, we obtained widely differing coefficients, with a general tendency for independent districts to spend slightly more than dependent districts, but subsequent analysis suggested that this slight difference might be attributable, in part, at least, to economies of scale.

We may conclude from the results of the above study that expenditure levels for education are, indeed, related to wealth, as measured by equalized valuation and median family income. The full importance of this finding will be highlighted in the next chapter, in which we report the relationship between resource inputs and the outcomes of education. We conclude at that point that there is a definite relationship between the wealth of a sub-region of a state and the educational opportunities afforded to the individual, as measured by educational expenditures.

CHAPTER FIVE

TALENT DEVELOPMENT AND INCOME[1]

Introduction

In this chapter, we suggest a rationale for the following two statements. First, there is a relationship between resource inputs in education and educational outcomes. This statement implies that the most significant contributions of education are made when the outcomes are maximized for given input levels -- that is, where the educational system is efficient.[2] Second, there is a relationship between the rate of talent development in a society and the rate of economic growth.[3] This statement incorporates the suggestion that increased rates of economic growth can be produced by means of deliberate efforts to maximize the development of human talent.

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[1] This chapter is based on a doctoral dissertation by J. Alan Thomas: "Efficiency in Education: A Study of the Relationship Between Selected Inputs and Test Scores in a Sample of Senior High Schools."

[2] Efficiency here is defined as the maximization of outcomes for a given level of inputs, or, alternatively, as the minimization of inputs for given output levels.

[3] Talent is defined as a measure of performance of pupils on achievement tests, or other measurable indices of attainment of the defined goals of the school. Economic growth is an increase in per capita national income.

The first statement will be supported by an empirical study, utilizing a methodology by means of which we examine the effect of specific input combinations and specific processes and methods on educational outcomes -- including expected income. Furthermore, it offers a framework within which educational efficiency may be studied.

We deal with individuals and their abilities, and ignore problems related to collective ability. However it is recognized that the contribution of education to economic well-being results largely from interaction among educated people, and is not merely the sum of individual contributions. It may be, for example, that the ability of individuals to participate in complex organization is a necessary and sufficient condition for economic growth, while a high level of individual ability is necessary but not sufficient. This point of view is presented by Faris:

> . . . collective ability is not only a matter of technical knowledge, but also of general comprehension of social wisdom, as well as of popular aspiration toward excellence in a variety of fields of mental activity. A high level of collective ability produces not only science and machinery, but also efficient organizational behavior; this in turn allows effective complex governmental, economic, and social organization.[4]

Having stated this caveat, we will now proceed to discuss the relationship between talent development and income. We first outline the literature that bears on the problems that have been advanced. We next discuss in more detail the concepts "talent" and "talent development." Then, we present the empirical study that deals with the concept efficiency, and indicates that inputs in education are indeed related in a measurable way to levels of outcome. Finally, we return to the relationship between education and income, and suggest how the relationship might be specified more precisely.

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[4] Robert E. L. Faris, "Reflections on the Ability Dimension in Human Society," American Sociological Review, XXVI (December 1961), 387.

Review of previous research

1. The "Cost-Quality Studies"

A large number of studies, inspired for the most part by Professor Paul Mort of Columbia University, have examined the relationship between expenditure levels and various aspects of educational "quality."[5] In some instances, the criterion of quality is achievement-test results. In others it is some rating of the school itself, in terms of the use of superior methods of teaching and administration. For the most part, the criterion of superiority is "adaptability" -- the acceptance of change.

These studies show a uniformly high correlation between expenditure levels and the various measures of quality. In some instances, however, the relationship is a functional one; the quality measures are directly related to expenditures. Furthermore, adaptability is a biased criterion of quality, especially if it is made operational through the specification of practices observed in the high expenditure schools.

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[5] Paul R. Mort, Walter C. Reusser, and John W. Polley, Public School Finance (New York: McGraw-Hill, 1960), Chap. 5.

The Cost-Quality and Adaptability Studies are summarized in Donald H. Ross, et al., Administration for Adaptability, Vols. I-IV (New York: Columbia University, 1951).

See also James H. Crandall, A Study of Academic Achievement and Expenditures for Instruction. Unpublished Ed.D. dissertation, University of California (Berkeley, 1961).

Nevertheless, these studies have pioneered the way toward relating inputs and outcomes in education. It remains to elaborate on them by considering further the identification and measurement of educational outcomes, and by utilizing statistical techniques that allow for a complex interaction among input variables.

2. Applications of Efficiency in Economics

The concept efficiency is borrowed from the science of economics, where it was originally formulated in connection with the theory of the firm. In this context, inputs and outputs are clearly defined, and efficiency is a primary objective. In a rational world, the entrepreneur will combine resources in such a way as to maximize the firm's profit.[6/]

Recently, attempts have been made to study the efficiency of governmental agencies. Eckstein and others have examined the problems related

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[6/] Research in social psychology throws some doubt on the degree of rationality that exists in the operation of the business firm. Simon suggests that entrepreneurs do not, in fact, act in such a way as to maximize profits. Rather, they seek a satisfactory solution--one in which the firm will be able to remain in business because each of the participants (employee, employer, and customer) receives an excess of rewards or incentives over the contribution he makes to the survival of the organization.

See: C. E. Barnard, The Functions of the Executive (Cambridge: Harvard University Press, 1938).

Herbert A. Simon, Administrative Behavior, 2d ed. (New York: Macmillan, 1961).

Herbert A. Simon, "A Comparison of Organization Theories" and "A Behavioral Model of Rational Choice" in Models of Man (New York: Wiley, 1957), pp. 170-82, 241-60.

to water resource development.[7] Here, inputs and outputs are for the most part identifiable and quantifiable. The major problems lie in the measurement of the "social costs and benefits"[8] of the projects. Hitch and McKean have examined the problem of efficiency in the operation of the defense establishment.[9] The main question in this case is the choice of a criterion; what should be maximized? Finally, there have been several recent attempts to apply the efficiency concept to education.[10]

Talent development in education

In this study of "efficiency in education," we postulate a relationship between inputs and outcomes. If this relationship can be established, we can proceed to formulate hypotheses regarding the probable effect of changes in the magnitude and nature of those inputs that are subject to control.

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[7] Otto Eckstein, Water Resource Development (Cambridge: Harvard University Press, 1958).

John V. Krutilla and Otto Eckstein, Multiple Purpose River Development (Baltimore: Johns Hopkins Press, 1958).

[8] Social costs and benefits are by-product effects that do not appear in the profit and loss accounts of private or public enterprise. Thus, damage to downstream sport fishing facilities and an increase in upstream recreational opportunities are, respectively, social costs and benefits connected with the building of a power dam.

[9] Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age (Cambridge: Harvard University Press, 1960).

[10] Charles S. Benson, The Economics of Public Education (Boston: Houghton-Mifflin, 1961), Chap. 2.

Joseph A. Kershaw and Roland N. McKean, "Systems Analysis and Education" (Research Memorandum, Santa Monica: The Rand Corporation, 1959).

Joseph A. Kershaw and Roland N. McKean, "How to Make School Decisions: An Outsider's View" School Management (May 1960), p. 68.

The outcome on which this study focuses is the achievement of desired levels of economic growth. The contribution of research in economics in quantifying the relationship between resource inputs in education and economic growth is of immediate relevance.[11] In this chapter we do not claim to measure the effect of education on economic growth, but rather seek to measure outcomes, which, it is assumed, are related in the long run to the achievement of economic growth. The advantage gained by this procedure is that both inputs and outcomes are defined operationally. Furthermore, specific inputs can be related, in their effect, to specific outcomes.

The problem presented here, and relevant to future studies, is that of identifying and ranking the operationally defined outcomes of the school. We have chosen to regard the results of tests of achievement as measures of educational outcomes, while recognizing that other outcomes are valued and probably can be measured. Future studies may include other outcomes. The main point is that once an input-output relationship is established, it is possible to study the effect upon the efficiency of the school system of trading among inputs and among outcomes.

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[11] See, for example: Theodore W. Schultz, "Education and Economic Growth" in Social Forces Influencing American Education. Sixtieth Yearbook of the National Society for the Study of Education, Part II, University of Chicago Press, 1961.

Gary S. Becker, "Underinvestment in College Education," Proceedings, American Economic Review (May, 1960).

Edward Denison, Economic Growth in the United States and the Alternatives Before Us. New York: Committee for Economic Development, 1962.

In developing our presentation, we propose the hypothesis that the outputs of education are functions of selected inputs -- the latter representing the effect of school, home, and community. We do not include any measure of the effect of genetic differences in determining differences among schools in mean test scores. Our position is that we are probably so far from attaining the maximum possible levels of development of human ability that differences in innate capacity can, for practical purposes, be disregarded.

> There is no known upper limit to human ability, and much of what people are capable of doing with their mind is probably unknown today. In this sense, it can hardly be said that any person has ever done the best he can. Research might make possible for all people constantly higher levels of aspiration and attainment.[12/]

We use the word "talent" to include those results of education that can be measured and identified. Talent is a multi-dimensional concept, and comprises many aspects of human development. Furthermore, the aspects of talent that are meaningful for one person may, for another, be relatively unimportant.

One of the most important characteristics of a society is the degree to which talent is distributed throughout the population. The following mathematical formulations present the notion of the "pool of talent" in

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[12/] The Educational Policies Commission, The Central Purpose of American Education (Washington: National Education Association, 1961), p. 14.

a community or a nation. These formulations have been prepared to illustrate the text. They have no operational value. In particular, addition does not adequately represent the pooling of talent. In fact, the effective utilization of abilities probably depends, above all else, upon interactions among individuals. Thus, the pooling of talent may be a multiplicative rather than an additive process.

a. It is assumed that, at any period of time, there are limits to a potential ability of a given person, determined by genetic factors, early home training, and other factors beyond the control of the educational system. Let X_1, X_2, . . . X_n represent statistical classes of individuals, grouped according to potential ability.[13] Then the total pool of potential ability in a given age group of a society is equal to:

$$X_1 + X_2 + \ldots X_n \qquad (1)$$

b. By means of all the educational agencies under its control, society is able to develop this potential ability to a given degree. Developed talent can be measured in terms of the individual's success in performing certain socially defined tasks. Let r_i be the degree to which the talent in each group is developed. (Expressed, for example, as a percentage.) The talent pool now becomes:

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[13] The X's are related to the number of people in the group, and their mean ability. Thus, $X_i = n_i A_i$, where n_i is the number of individuals in group i and A_i the mean potential ability of members of group i. The X_i's - ability abstracted from the influence of formal education - are not readily measured. Pre-school intelligence tests are difficult to administer and have low predictive power. Furthermore, a person's capacity to learn manifests itself in interaction with educational experiences. In other words, the developmental process is a gradual one, not separable for measurement processes from the effect of education. It is apparent, therefore, that the measurable statistics are the r_iX_i's. These can best be conceptualized in terms of IQ scores. The rX groups, therefore, are "ability groups" as the term is usually used.

$$r_1 X_1 + r_2 X_2 + \ldots r_n X_n \qquad (2)$$

One further factor must be considered. In a given society at a given time, a certain proportion of each rX group either leaves school or remains beyond a given grade level. Let t_i be the expected grade level attained by group r_i X_i before drop-out (on the basis of statistical frequencies). Then the total education (in years of school completed) achieved by all members of the age group is equal to:

$$t_{1(r_1X_1)} + t_{2(r_2X_2)} + \ldots t_{n(r_nX_n)} \qquad (3)$$ [14]

Where $t_{n(r_nX_n)}$ is the expected number of years, before school-leaving of, group r_iX_i

The major hypothesis of this study is that the expression (2) is related to the level of educational expenditures.[15]

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[14] Many talent studies consider only the t's, regarding the r's as given. See, for example, the otherwise excellent book by Dael Wolfle, America's Resources of Specialized Talent (New York: Harper, 1954). However, both the r's and the t's are subject to social control through education.

A major weakness of this formulation is that years at school are not equal, with respect to (a) the amount of education they represent, (b) their cost, or (c) their yield in terms of additional expected income.

Inputs in education

We have postulated that outcome levels, as represented by mean scores attained in a test of achievement, are related to certain inputs into the educational system. We will now discuss the nature of these inputs in more detail.

Levels of educational achievement are, we assume, dependent on the effect of the school, home, and community. We include variables in our analysis that relate to these three categories of environmental effect.

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[15] This suggests the following problems: What is the optimal allocation of resources among the rX groups in accordance with (a) equality of educational opportunity? (b) maximization of the total pool of human resources? The treatment of these questions is beyond the scope of this study. However, the following lines of thought may prove promising in a further exploration of these matters.

(1) "Equality of educational opportunity" does not mean that equal resources should be devoted to individuals in each r group. Neither does it imply an attempt to equate all the r's and all the t's in a Herculean effort to make unequals equal. The correct rule, it would appear, is that resources should be allocated among the rX groups so as to make the marginal utilities of the last dollar spent equal among groups. Operationally, this rule is difficult to apply because utilities are vector quantities, functions not only of expected future income, but of certain esthetic and moral qualities that are equated with the "good life." The social benefits of education must also be included in the vectors--for example, the savings in unemployment benefits and police protection which may result from the education of the low ability groups.

(2) The rule for maximizing the total pool of human resources is clear-- resources should be allocated among groups in such a way that the marginal increments in talent are equal,for the last dollar spent in each group. The problem again is, of course, that "talent" is a multidimensional concept and that some aspects of talent cost much more than others to develop. (For example, vocational education in high school costs more than the preparation of future college students.) Finally, it is noted that the "maximization of the talent pool" may not be the socially desired objective.

The influence of the school can be analyzed first in terms of the resource inputs that are required. Goods and services, in varying quantities and combinations, are a measure of society's contribution to its schools. Thus, such measures as expenditure (per pupil), teachers' salaries, books in the library, and characteristics of the school plant are identifiable, measurable indices of input. Inputs must also include organizational and administrative variables.

Our accounting of society's contribution to the school system is not exhausted by a listing of the inputs into its operation. It has often been observed that achievement in school is related also to the nature of the community and the home--the salary and occupation of the father; the level of the education of both parents; and other variables characteristic of the home and the community.

From one point of view, outcomes in education result from the individual action, and the interaction, of a number of variables that represent the effect of the school, home, and community. From another point of view, we may attempt to hold the influence of home and community constant, and examine the relation between the variables that represent the effect of the school. The advantage of this latter method is that it should produce hypotheses suggesting the control society may exercise over talent development, by means of the school system. However, we are again reminded that the relationship between the variables that represent the effect of the school and the community is an interactive one -- it is difficult to determine the separate effect of any one variable or group of variables.

A description of the empirical study

As noted above, we have developed the hypothesis that certain measureable outcomes of education are related to resource inputs and to the characteristics of home and community. We will now present three sets of variables that refer to (a) the outcomes of education, (b) resource allocations and administrative practices within the school system, (c) socioeconomic characteristics of the home and community. For each independent variable listed, we will state the direction of its hypothesized relationship with the dependent variables. We will then outline the procedure we have used to obtain the sub-sample of schools on which this study is based. Finally, we will describe the statistical processes which were used to analyze the data and to test the hypotheses.

1. The Variables

The Dependent Variables. Our measure of outcome will be mean scores on a battery of achievement tests, developed and administered by the staff of Project TALENT of the University of Pittsburgh.[16]

There are 18 dependent variables in the complete analysis. These variables are listed in Table 12 below. The variable numbers are those used in the machine analysis. The test numbers are identification numbers used by Project TALENT.

The Independent Variables. (1) Indices of the Effect of the School. We have presented above a rationale for the hypothesis that inputs into a school system--in the form of goods and services--will be related to output levels, if other relevant factors are held constant. The variables listed in Table 13 represent inputs--goods, services, and organizational arrangements. These data, also were obtained from the Project TALENT data bank.[17/]

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[16] Project TALENT, "The Tests of Project TALENT," Bulletin No. 3, University of Pittsburgh (December 1960).

(2) Characteristics of the Home and Community. We have hypothesized that certain characteristics of the home and the community will affect the outcomes of education. As noted above, we cannot consider the school to be acting independently of the community and the home. Hence, we may expect an interaction among the variables from these different categories; the variables are listed in Table 14.

Another problem is that in some cases, the dependent and independent variables may, in a different frame of reference, be reversed. Thus, family income may be a factor leading both to improved schools and to a more stimulating home environment. At the same time, better education should lead to higher incomes and, hopefully, to more educative home settings for the next generation.

One group of variables relating to home and community (Table 14) leads to particularly perplexing conceptual problems. It consists of variables 41 (absenteeism), 47 (delinquency rates), 48 (drop-out rates), and 49 (percentage of boys in last year's graduating class who went on to college.) On the one hand, these should probably be regarded as "outcomes" and treated as dependent variables. On the other hand, they are probably closely related to the parents' aspirations for their children, and tell us more about characteristics of the home and community

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[17/] The data-gathering instrument used by Project TALENT is, "A National Inventory of Aptitudes and Abilities," School Questionnaire, General School Characteristics, University of Pittsburgh 1960.

TABLE 12

Dependent variables: sub-scores of Project TALENT test battery (school means)

Variable Number	Test Test Number	 Description	Grade
16	190	Information Test Total	10 Boys
17	190	Information Test Total	10 Girls
18	190	Information Test Total	12 Boys
19	190	Information Test Total	12 Girls
20	230	English Total	10
21	230	English Total	12
22	250	Reading Comprehension	10
23	250	Reading Comprehension	12
24	260	Creativity	12
25	270	Mechanical Reasoning	12
26	290	Abstract Reasoning	10
27	290	Abstract Reasoning	12
28	312	Mathematics II	10
29	311	Mathematics I	12
30	312	Mathematics II	12
31	333	Mathematics III	12
32	107	Physical Sciences	12 Boys
33	112	Mechanics	12 Boys

TABLE 13

Independent variables:
A. Selected characteristics of the high school

Variable Number	Description of Variable	Hypothesized Direction of Relationship
12	Size of 12th grade class	+
13	Median starting salary--male teachers	+
14	Per pupil expenditure in school system (Gr 9-12)	+
34	Type of secondary school (Comprehensive, etc.) (A positive correlation indicates higher scores in academic, as opposed to comprehensive, high schools.)	+
35	Grades included in the secondary school (A positive relationship here would indicate a bias in the following order: G-10-12, 9-12, 8-12, 7-12, 1-12.)	+
36	Number of days in the school year	+
37	Size of average instructional class: science and math	-
38	Size of average instructional class: non-science	-
39	Average amount of homework expected	+
40	Number of study-hall periods per week	Null
42	Number of books in the school library	+
43	Age of the school building	Null
44	Provision for homogeneous grouping	Null
45	Median starting salary--female teachers	+
46	Average experience of teaching staff	+
50	Does the school have a guidance program?	+

TABLE 14

Independent variables:
B. Characteristics of the home and the community

Variable Number	Description of Variable	Hypothesized Direction of Relationship
1	Town population	+
2	Adult population--median years schooling	+
3	Civilian labor force: Percent unemployed	-
4	Civilian labor force: Percent engaged in manufacturing	Null
5	Median family income	+
6	Location of community: Miles to nearest city of 100,000 or more	-
7	Population: Percent rural farm	-
8	Percent of children attending private schools	Null
9	Percent of population residing in state of birth	-
10	Employed persons: Percent in white collar occupations	+
11	Occupied homes: Percent occupied by owner	+
15	Quality of housing in area served by the school	+
41	Average daily percentage of absenteeism	-
47	Rate of delinquency	-
48	Drop-outs after entry into 10th grade	-
49	Percentage of boys in last year's senior graduating class who went on to college	+

than they do about school effectiveness. The interaction is a complex one: the influence of the home and school, together and separately, determines the magnitude of the effect of these factors. For our purposes, these items will be treated as independent variables. Regardless of their status (dependent or independent), they are observable, measurable phenomena that increase our ability to predict the magnitude of the dependent variables.

Values of Variables 15, 41, 47, and 48 were supplied by Project TALENT from their data bank. Data for Variables 1-11 were obtained from 1960 Census publications.[18/]

2. Sampling Procedures and Methods of Data Analysis

After describing the manner in which the sample of high schools was selected, we will turn briefly to the statistical procedures used in this study.

The following quotation outlines the procedure used by the officers of Project TALENT to select their sample of schools.

> Our basic list of public senior high schools (i.e. public schools including a 12th grade) was supplied by the U. S. Office of Education from their 1958-59 Survey of Public Secondary Day Schools. These schools were sorted by states and arranged by the nine U. S. Office of Education Regions, treating the five largest cities as a separate Region. Within each state, schools were sorted into four size categories . . . The four size categories and their sampling ratios are presented below:

[18/] U. S. Bureau of the Census, Census of Housing, 1960: Census of Population, 1960: General Population Characteristics; and Census of Population, 1960: General Social and Economic Characteristics.

Category	Size		Sampling Ratio
1	0-24	12th graders	1 in 50
2	25-99	12th graders	1 in 20
3	100-399	12th graders	1 in 20
4	400+	12th graders	1 in 13

Using an IBM 650, a random sample was drawn from each of the four size categories, adding remnants to the same size category in a contiguous state.[19]

The Project TALENT sample consists of 1,357 schools. In obtaining a sub-sample, our main concern was to narrow the range of population in the community in which the school was located. (We are no longer concerned with just a ten-state sample.) We eliminated large cities in order to avoid situations in which census data would not be representative of a given school. Census data are not available for communities of less than 2,500 population, so this formed a useful lower population boundary.

Our sub-sample therefore comprises all the public senior high schools in the Project TALENT sample in communities with a population of from 2,500 to 25,000. In several instances, two Project TALENT schools were located in a given community, in which case both schools were eliminated from the sample. The resulting sample includes 206 high schools in 46 states.

As for our statistical methods, the means, standard deviations, and N's are laid out in Table 19, pp. 136-38. In Table 20, pp. 139-42, the 50 x 50 zero-order correlation matrix is presented.

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[19] David B. Orr, "Selected Characteristics of American High Schools," mimeo., University of Pittsburgh, Project TALENT (Feb. 12, 1962), p. 1.

The basic statistical method used is multiple regression. A coefficient of multiple regression is the correlation between two variables--the dependent variable and a variable which consists of the weighted sum of a number of independent variables.[20/]

The regression equation is reported with coefficients in beta form. This form shows the (beta) weights to be applied to each variable, expressed in z form, in order to minimize the sum of squared variations between the predicted value and the true value of the dependent variable.

In the stepwise regression analysis, variables are added, one at a time. As each variable is added, the variance associated with that variable is added to "explained" portion of the variance of the dependent variable. Furthermore, we may observe the effect of the addition of a third variable on the co-variance between a given independent variable and the dependent variable. The observation of this effect is an important aspect of explanation by multiple-regression analysis.

F tests will be used in all cases to test for significance. Acceptance of hypotheses will be at p = .01.

Summary of findings

1. The Variables

Specific data regarding the variables are reported in Table 19 (pp. 136-38) which presents the means, standard deviations, and N's for each variable; Table 20 (pp. 139-42) gives the 50 x 50 zero-order correlation matrix of school and community characteristics and mean test scores.

[20/] See Philip H. Dubois, Multivariate Correlational Analysis (New York: Harper and Brothers, 1957), p. 1

2. The Coefficients of Multiple Regression

In Table 15 below are reported the multiple R's for each dependent variable. The value of multiple R provides an estimate of the combined predictive power of the set of independent variables. An F of 1.81 is significant at p = .01.

The first important findings relate to the large values of multiple R. It appears that it is possible to predict mean school test scores with a considerable degree of accuracy from a matrix of variables that describe the school, home, and the community. It is beyond the scope of the study to pursue the full implication of the findings. For our purpose, it is sufficient to note that the basic hypothesis of this section -- that mean test scores are related to certain characteristics of school, home and community -- is confirmed.

It is worth noting, too, that prediction of mean school scores is highest for the Information Test Totals, and for these sub-tests that correlate highly with it -- particularly Reading Comprehension and Mechanics. The correlations between Variable 25 (Mechanical Reasoning) and Information Test Totals are relatively low, despite the large multiple R for the former. With this exception, the best predictions from our school and community variables to mean test scores are obtained in the case of Information Test Total scores and their close correlates (See Table 17).

TABLE 15

Coefficients of multiple regression
(Dependent variables 16-33. Independent variables 1-15 and 34-50)

Dependent Variable No.	Variable		Multiple Regression Coefficient	DF	F
16	Information Test Total	Gr. 10 M	.8600	179	15.89
17	Information Test Total	Gr. 10 F	.8572	179	15.49
18	Information Test Total	Gr. 12 M	.8699	179	17.40
19	Information Test Total	Gr. 12 F	.8411	179	13.52
20	English Test Total	Gr. 10	.8238	179	11.81
21	English Test Total	Gr. 12	.8287	179	12.26
22	Reading Comprehension	Gr. 10	.8518	179	14.79
23	Reading Comprehension	Gr. 12	.8491	179	14.45
24	Creativity	Gr. 12	.8266	179	12.07
25	Mechanical Reasoning	Gr. 12	.8529	179	14.93
26	Abstract Reasoning	Gr. 10	.8133	179	10.93
27	Abstract Reasoning	Gr. 12	.8348	179	12.86
28	Mathematics Part II	Gr. 10	.7709	179	8.20
29	Mathematics Part I	Gr. 12	.8242	179	11.85
30	Mathematics Part II	Gr. 12	.7970	179	9.74
31	Mathematics Part III	Gr. 12	.7695	179	8.12
32	Physical Sciences	Gr. 12 M	.8251	179	11.93
33	Mechanics	Gr. 12 M	.8504	179	14.62

TABLE 16

Sub-matrices showing zero-order correlations

(1) Information Test Totals and Reading Comprehension (by grades)

	22 (10th grade)		23 (12th grade)
16	.971	18	.959
17	.964	19	.938

(2) Information Test Totals and Mechanics

	33 (12th grade boys)
18	.952

TABLE 17

Regression equation with dependent variable number 18, and coefficients in beta form

Variable	1	2	3	4	5	6
Beta	-.1497	.0220	.0410	.0464	.2008	.0646
SE Beta	.0030	.0032	.0029	.0032	.0053	.0029
7	8	9	10	11	12	13
-.0711	.1379	-.0119	-.0940	.0657	.0650	.3498
.0036	.0033	.0034	.0043	.0029	.0036	.0100
14	15	34	35	36	37	38
.0815	-.1608	.0962	-.0645	-.0940	-.0414	-.0687
.0034	.0032	.0026	.0028	.0028	.0038	.0038
39	40	41	42	43	44	45
-.0274	.0180	-.1403	.1103	.1537	.0305	-.2829
.0025	.0025	.0028	.0029	.0026	.0027	.0104
46	47	48	49	50		
.1088	.0433	.0423	.2299	.0903		
.0028	.0027	.0026	.0030	.0028		

F's are large for all coefficients. Hence, each of the independent variables is significantly related to Dependent Variable 18.

3. The Separate Effects of School, Home, and Community

This study is based on the hypotheses that outcomes in education are related to (a) characteristics of the school, and (b) characteristics of the home and community. In the next section we discuss the relationship of the 32 independent variables with the 18 dependent variables. The effect of both categories of independent variables is such as to support the general hypotheses.

To what degree is the outcome of education due to the school, as opposed to the home and community? We have considered the possibility of using factor analysis to separate the effects of these groups of variables. However, an examination of the correlation matrix indicates that the clusters would cut across the home-school-community boundaries. Observe, for example, the correlation of .656 between starting salary of men teachers and the median family income of the community.

We have therefore discarded factor analysis as a tool in this study, and do not attempt to measure the separate effect of home and community. Instead, let us now consider the effect of each independent variable.

4. The Regression Equations

It is not possible, and probably not desirable, to show all the regression equations. For the present analysis, we have selected the equation that contains Dependent Variable 18 (Information Test Total, Boys, 12th grade). First, we present the equation with beta coefficients. Second, we indicate the order in which the variables are added in the stepwise regression analysis. Third, we examine each variable separately, in the light of the specific hypotheses that were formulated.

TABLE 18

Effect on multiple R of the successive addition of ten independent variables, in order of the magnitude of their effect

Dependent Variable	Ten Independent Variables added -- Resulting Multiple R									
16	(13)	.5924	(15)	.6953	(41)	.7376	(5)	.7602	(43)	.7803
	(49)	.8047	(34)	.8119	(38)	.8193	(35)	.8261	(39)	.8304
17	(13)	.6081	(15)	.6937	(41)	.7370	(5)	.7673	(49)	.7904
	(43)	.8136	(38)	.8236	(47)	.8287	(34)	.8327	(4)	.8363
18	(13)	.6171	(15)	.7131	(49)	.7508	(43)	.7714	(5)	.7960
	(41)	.8140	(42)	.8210	(34)	.8276	(50)	.8332	(1)	.8379
19	(13)	.5942	(15)	.6824	(49)	.7157	(43)	.7511	(5)	.7779
	(41)	.7931	(39)	.8006	(34)	.8065	(1)	.8102	(46)	.8155
21	(15)	.4985	(42)	.5903	(41)	.6468	(49)	.6765	(34)	.7044
	(46)	.7266	(5)	.7508	(1)	.7730	(35)	.7873	(43)	.7948
23	(13)	.5375	(15)	.6436	(46)	.6870	(49)	.7215	(5)	.7410
	(1)	.7605	(43)	.7746	(34)	.7878	(35)	.7989	(41)	.8079
27	(13)	.5521	(15)	.6636	(46)	.7071	(49)	.7417	(1)	.7616
	(5)	.7804	(35)	.7919	(48)	.7976	(6)	.8034	(4)	.8109
30	(13)	.5140	(49)	.6374	(46)	.6804	(5)	.7091	(15)	.7267
	(1)	.7452	(48)	.7543	(43)	.7627	(6)	.7684	(38)	.7733

In multiple-regression analysis, the "explained" portion of the variance of the dependent variable is increased by adding to it the variance that is associated with each independent variable. The program used in our analysis adds the independent variables in the order of the magnitude of their effect on the variance of the dependent variable. An examination of the increase in multiple R for each variable added is instructive. This procedure does not, however, give a true picture of the relative importance of each variable, as the increase in the explained part of the variance of the dependent variable produced by the addition of a given independent variable depends upon the order in which the independent variables are added. Furthermore, the last variables added may show little or no increase in multiple R, since their covariance with the dependent variable has been reduced by the previous addition of other independent variables. In Table 18 we showed the effect of the addition of the first ten independent variables on the explained variance of eight selected dependent variables.

5. Independent Variables Affecting Test Scores

a. Characteristics of the School (hypothesized relationship in parentheses)

Variable No. 12 --Size of 12th Grade Class (+) All evidence supports the hypothesis. Variable 12 has fairly high zero-order correlations with the dependent variables. It is also positively related to the size of the community and to median salaries. Although the correlation between variables 12 and 18 drops when the effect of other variables is considered, it remains significantly positive.

We therefore have strong evidence that mean test scores are positively correlated with the size of the 12th Grade Class.

Variable No. 13 --Median Starting Salary--Male Teachers (+) This hypothesis receives very strong support. In only one test (12th Grade English) is this not the most significant variable. Like other variables, however, it is correlated with the other independent variables, and, when another variable is held constant first, Variable 13 falls far behind. Nevertheless, we can conclude without equivocation that starting salaries of male teachers are strongly correlated with mean test scores.

Variable No. 14 --Per Pupil Expenditure (+) This hypothesis is accepted, because the correlation between expenditures and mean test scores remains significantly positive after Variable 13 and other variables that correlate with Variable 14 are held constant. Nevertheless, it is worth noting that Variables 13 and 14 are closely related, and whichever is held constant first reduces considerably the covariance between the other and the given dependent variable.

Variable No. 34 --Type of Secondary School (+) This hypothesis is rejected. Scores were higher in comprehensive high schools. More generally, this is evidence that the type of organization of the school is related to levels of outcome.

Variable No. 35 --Grades Included in the Secondary School (+) This hypothesis is accepted. Schools containing kindergarten to grade 12 or grades 1 to 12 did more poorly than all other schools combined.

Variable No. 36 --Number of Days in the School Year (+) This hypothesis is supported. There is a positive relationship between [illegible] mean test scores and the length of the school year. The relationship weakens but remains positive when other independent variables are held constant.

Variable No. 37 --Class Size in Science and Math (-) This hypothesis is supported. There is a small but significant negative relationship between class size and mean test scores.

Variable No. 38 --Class Size in Non-Science Courses (-) This hypothesis is supported.

Variable No. 39 --Average Amount of Homework Expected (+) Interestingly enough, this hypothesis is disproved. There is a small but significant negative relationship between homework expected and mean test scores. The indication is that this is a variable related to teaching techniques and administrative practice.

Variable No. 40 --Number of Study-Hall Periods Per Week (Null) In view of the very low zero-order correlations with the dependent variables and with the other independent variables, and the low beta coefficients, this is not a very interesting variable. The null hypothesis is not rejected.

Variable No. 42 --Number of Books in the School Library (+) This hypothesis receives strong support. Interestingly enough, Variable 42 correlates most strongly (zero-order correlation = .476) with mean test scores for 12th Grade English.

Variable No. 43 --Age of the School Building (Null) This has proved to be one of the most useful of the independent variables. The null hypothesis is rejected--there is a persistent positive relationship between Variable 43 and mean test scores. It appears reasonable to assume that the positive relationship between the age of a school building and mean test scores may be due to the stable patterns of interaction within the school and between school and community that characterize old, well-established schools.

Variable No. 44 --Provision for Homogeneous Grouping (Null) A negative correlation here indicates that schools which group pupils homogeneously have higher mean test scores. The zero-order correlations are consistently negative, but small, and the relationship is reduced rapidly when other independent variables are removed. The beta coefficients are very small. The null hypothesis is not rejected.

Variable No. 45 --Median Starting Salary--Female Teachers (+) This hypothesis is accepted. However, salaries of male and female teachers are so closely related they are almost identical. When Variable 13 is added, the correlation between Variable 45 and the dependent variables drops nearly to zero.

Variable No. 46 --Average Experience of Teaching Staff (+) This hypothesis also receives strong support. Interestingly enough, the betas are largest for Variables 21, 23, 24, 27, and 30. It appears that teaching experience is most important in the senior courses.

Variable No. 50 --Does the School Have a Guidance Program? (+) (The plus sign indicates that a "Yes" answer to the question is positively correlated with test scores.) This hypothesis is tentatively accepted. The zero-order correlations are uniformly positive, but the covariances drop sharply as other independent variables are added.

b. Characteristics of Home and Community

Variable No. 1 --Population of the Town or City (+) This hypothesis must be rejected. The zero-order correlations are mixed positive and negative, and all small. It appears that the population of the community is not an important determinant of mean test scores in communities of this range in size.

Variable No. 2 --Median Years Schooling of Adult Population (+) This hypothesis is accepted. The zero-order correlations are uniformly positive, but the covariances drop when other related independent variables are removed from the matrix. Nevertheless, a highly significant relationship remains.

Variable No. 3 --Percent of Civilian Labor Force Unemployed (-) This hypothesis is rejected. There is a uniformly negative set of zero-order correlations, but they drop almost to zero when other independent variables are introduced.

Variable No. 4 --Percent of Civilian Labor Force Engaged in Manufacturing (Null) The null hypothesis is rejected. There is a positive correlation between Variable 4 and the dependent variables. The relationship between Variable 4 and the dependent variables remains when the effect of other independent variables is held constant.

Variable No. 5 --Median Family Income (+) This hypothesis receives strong support. Variable 5 appears to be one of the best predictors of mean test scores.

Variable No. 6 --Distance from Nearest City of 100,000 or More (-) This hypothesis is rejected. A small negative relationship between

Variable No. 6 and most of the dependent variables disappears when other independent variables are added.

Variable No. 7 --Percent of Population Rural Farm (-) This hypothesis is also rejected. The negative relationship observed in the zero-order correlation coefficients disappears when other independent variables are held constant.

Variable No. 8 --Number of Children Attending Private Schools (Null) The null hypothesis is firmly rejected. A strong positive relationship between Variable No. 8 and the dependent variables persisted as other independent variables were added. In cities of the size included in this sample, private school attendance appears to be related to improved performance in the public schools.

Variable No. 9 --Percent of Population Residing in State of Birth (-) This hypothesis is tentatively accepted. The consistent negative relationship observed between Variable No. 9 and the dependent variables tended to remain in most (but not all cases) when other independent variables were held constant.

Variable No. 10 --Percent of Employed Persons in White Collar Occupations (+) This hypothesis is rejected. The strong and consistently positive correlations between Variable No. 10 and the dependent variables dropped nearly to zero or became negative when other independent variables were introduced. It appears that this variable is a function of others--in particular, of median family income.

Variable No. 11 --Percent of Occupied Homes Occupied by Owner (+) This hypothesis is tentatively accepted. The uniformly positive zero-order correlation coefficients tended to remain when other independent variables were added.

Variable No. 15 --Quality of Housing in Area Served by the School (+) This was a very valuable variable--the hypothesis is accepted. The negative correlation (indicating a relationship between good housing and high mean test scores) remained throughout the analysis. In the case of 12th Grade English, this was the most important of all the independent variables.

Variable No. 41 --Average Daily Percentage of Absenteeism (-) This hypothesis is also accepted. In terms of our present analysis, this indicates that where persistent absenteeism is permitted by parents, mean test scores are low. At the same time ineffective schools will tend to produce high rates of absenteeism and low mean test scores.

Variable No. 47 --Rate of Delinquency (-) This hypothesis is rejected. A low, but persistent, positive relationship is observed.

Variable No. 48 --Drop-Outs After Entry Into 10th Grade (-) The hypothesis is rejected. The relationship between Variable No. 48 and the dependent variables becomes positive when other independent variables are added. The relationship between drop-outs and mean test scores may be due to two opposing effects. First, if many students with low test scores drop out, the relationship between drop-outs and mean scores may be strongly positive, since the best students are those who remain. On the other hand, if drop-out rates reflect in part the effectiveness of the schools, the relationship will be negative. Schools that produce high test scores also produce low drop-out rates. The first effect appears to predominate.

Variable No. 49 --Percent of Boys in Last Year's Graduating Class Who Went to College (+) This hypothesis is accepted. Variable No. 49 is another of the most useful independent variables. The likely explanation is that communities in which college attendance is favored will have higher mean test scores.

6. Talent development and economic growth

The empirical study described above demonstrates that inputs in education are related to levels of outcome attained --at least for communities within the defined population range. With the characteristics of the home and community held constant, resource inputs--goods, services, and organizational variables--are related to test scores. We are now interested in a further question: Are these inputs related to future income expectations, and to the rate of our nation's economic growth?

In order to answer this question we propose two hypotheses that can be tested through empirical research. The first hypothesis is that test scores can be used to predict school-leaving age. We have at present some evidence of a positive relationship between test scores and years of schooling completed.[21] If this relationship is valid, we can forecast the total number of years of schooling to be completed by a given population sub-group on the basis of mean test scores for a school or school system. It is desirable, of course, to improve predictability here, as elsewhere, by introducing other variables such as parental status, and to use multiple regression techniques.

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[21] Wolfle, p. 146. Wolfle cites the following average AGCT scores to indicate the selection which takes place at the various levels of schooling:

The average of the total population is 100
The average of those who enter high school is 105
The average of those who graduate from high school is 110
The average of those who enter college is 115
The average of those who graduate from college is 121

The second statement is that school leaving age and attainment levels--as revealed in test scores--are good predictors of expected income. We have previously cited studies which indicate that income can be forecast on the basis of the number of school years completed.[22] It remains to be seen whether the standard error of prediction can be reduced by introducing test scores as a second predictor variable.

The hypothesis may be summarized as follows:

(1) Income is a function of the number of years of schooling completed. This statement, which summarizes the work of Miller and others, is as follows:

$$Y_i = A_0 + A_1 X_i + e_1 \qquad (1)$$

where A_0 and A_1 are constants, X_i is the number of years schooling completed, Y_i is the expected lifetime income of individual i, and e_1 is an error term. The best approximation is not necessarily a linear regression model.

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[22] H.S. Houthakker, "Education and Income," The Review of Economics and Statistics (February, 1959). Herman P. Miller, "Annual and Lifetime Income in Relation to Education: 1939-59," American Economic Review (December, 1960), pp. 962-85.

(2) But, the number of years schooling completed is, hypothetically, a function of test scores (S).

$$X_i = C_0 + C_1 S_i + e_2 \qquad (2)$$

C_0 and C_1 are constants, X_i is the number of years of schooling completed, and S_i the achievement test scores of individual i. e_2 is the error term. Again the linear regression model may not be appropriate; conceivably "S" may be the weighted sum of selected sub-scores, to be determined by multiple regression techniques.

(3) Therefore, income is a function of the number of years schooling and school achievement, as indexed by test scores:

$$Y_i = B_0 + B_1 X_i + B_2 S_i + e_3 \qquad (3)$$

Hopefully, equation (3), in which both school achievement and number of school years completed are used in our prediction of individual income, will provide a more accurate prediction of income than will equation (1).

Again we emphasize that linearity is probably not a realistic assumption in these hypotheses. Empirical work should attempt to define the functions on which the estimates of X and Y are to be based.

The implications of the above presentation are as follows:

(a) To maximize aggregates of expected lifetime income we must attempt to maximize the number of years of schooling, and performance for sub-groups. As noted above, this probably implies the allocation of resources among sub-groups in such a way that the marginal increments in talent are equal among sub-groups.

(b) In our empirical study, we obtained a regression equation which related a number of selected inputs to test scores. From this equation, it is possible to estimate the effect on test scores of increments in one or more of those independent variables that are subject to social control. Once the functions represented in equations (1), (2), and (3) above are known, it will become possible to relate increments in input into a school system to aggregates of expected lifetime income. To determine these functions and to estimate the effect of increments in input on total income is the task of a future study, to be based on the results described above.

TABLE 19

Means, standard deviation, and N's for dependent and independent variables

1. Dependent Variables:

Variable Number	Description	Grade	M	SD	N = 206
16	Information Test Total	10B	123.03	25.99	
17	Information Test Total	10G	111.22	21.18	
18	Information Test Total	12B	141.76	28.09	
19	Information Test Total	12G	124.04	21.52	
20	English Total	10	75.97	8.26	
21	English Total	12	83.05	8.16	
22	Reading Comprehension	10	26.18	5.97	
23	Reading Comprehension	12	30.68	6.38	
24	Creativity	12	8.97	2.21	
25	Mechanical Reasoning	12	10.34	2.49	
26	Abstract Reasoning	10	7.91	1.57	
27	Abstract Reasoning	12	8.62	1.85	
28	Mathematics II	10	9.24	1.90	
29	Mathematics I	12	8.56	1.90	
30	Mathematics II	12	10.26	2.30	
31	Mathematics III	12	3.40	.86	
32	Physical Sciences	12B	9.45	2.44	
33	Mechanics	12B	12.75	2.37	

TABLE 19 (Continued)

1-A. Independent Variables:

Variable Number	Description	M	SD	N = 206
12	Size of 12th Grade Class	110.73	83.19	
13*	Median Starting Salary--male teachers	6.96	1.26	
14	Per Pupil Expenditure in school system (Gr. 9-12)	334.12	144.67	
34*	Type of Secondary School (Comprehensive, etc.)	.96	.21	
35*	Grades Included in the Secondary School	.24	.43	
36	Number of days in school year	179.67	3.61	
37*	Size of average instructional class: science and math	8.34	1.36	
38*	Size of average instructional class: non-science	8.09	1.40	
39*	Average amount of homework expected	3.30	.65	
40*	Number of study hall periods per week	.09	.29	
42*	Number of books in school library	8.58	2.34	
43*	Age of the school building	4.64	3.24	
44*	Provision for homogeneous grouping	.22	.41	
45*	Median starting salary--female teachers	6.89	1.24	
46*	Average experience of teaching staff	4.46	1.06	
50*	Does the school have a guidance program?	1.84	.37	

*These values relate to numbers on a scale rather than to the actual magnitudes of the variables. See Project TALENT, School Questionnaire, _op_. _cit_. for the scales.

TABLE 19 (Continued)

2-B. Independent Variables:

Variable Number	Description	M	SD	N = 206
1	Town Population	8,143.00	4,992.00	
2	Adult Population--median years schooling	10.32	1.46	
3	Civilian Labor Force: Percent unemployed	5.32	2.81	
4	Civilian Labor Force: Percent engaged in manufacturing	26.70	16.15	
5	Median Family Income	5,230.72	1,356.14	
6	Location of Community: Miles to nearest city of 100,000 or over population	59.11	52.50	
7	Population: Percent Rural Farm	13.47	12.57	
8	Percent of Children Attending Private Schools	9.57	11.71	
9	Percent of Population Residing in State of Birth	78.02	14.55	
10	Employed Persons: Percent in White Collar Operations	33.95	8.88	
11	Occupied Homes: Percent Occupied by Owner	64.48	11.36	
15*	Quality of Housing in Area Served by the School	.34	.47	
41*	Average Daily Percentage of Absenteeism	2.51	.92	
47*	Rate of Delinquency	1.27	1.16	
48*	Drop-Outs after Entry into 10th Grade	1.56	.79	
49*	Percentage of Boys in Last Year's Sr. Graduating Class Who Went to College	4.58	1.93	

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*These values relate to numbers on a scale rather than to the actual magnitudes of the variables. See Project TALENT, School Questionnaire, _op_. _cit_. for the scales.

TABLE 20

ZERO-ORDER CORRELATION MATRIX

	1	2	3	4	5	6	7	8	9	10	11	12	13
1		.092	-.079	.094	.097	-.142	-.181	.148	-.075	.210	.081	.511	.052
2			-.224	.006	.556	-.020	-.160	.175	-.296	.379	.253	.258	.441
3				-.118	-.352	.168	.010	-.034	.071	-.045	-.186	-.037	-.066
4					.307	-.366	-.271	.337	.177	.070	.250	.257	.131
5						-.226	-.492	.498	-.387	.647	.498	.431	.656
6							.348	-.180	-.105	-.296	-.284	-.174	-.018
7								-.386	.380	-.592	-.181	-.321	-.243
8									-.041	.472	.332	.319	.461
9										-.487	-.131	-.180	-.400
10											.367	.371	.432
11												.194	.391
12													.386
13													

TABLE 20 (cont'd)

	14	15	16	17	18	19	20	21	22	23	24	25
1	.041	-.125	.037	.025	.004	-.011	.052	-.064	.045	-.036	-.086	-.057
2	.307	-.353	.358	.388	.365	.410	.257	.255	.330	.351	.362	.253
3	-.053	.182	-.066	-.093	-.104	-.105	-.080	-.090	-.073	-.094	-.127	-.055
4	-.002	-.089	.166	.159	.177	.136	.146	.194	.138	.169	.168	.151
5	.537	-.353	.569	.597	.594	.576	.465	.430	.551	.521	.526	.453
6	-.040	.066	-.041	-.049	-.034	-.045	-.028	.007	-.043	-.022	.009	.079
7	-.182	.028	-.176	-.167	-.223	-.127	-.141	-.120	-.175	-.152	-.138	-.127
8	.335	-.124	.342	.330	.365	.307	.263	.249	.313	.312	.322	.241
9	-.300	.121	-.263	-.274	-.253	-.254	-.208	-.129	-.270	-.235	-.209	-.254
10	.471	-.251	.402	.414	.389	.364	.321	.226	.385	.358	.322	.292
11	.311	-.177	.305	.324	.341	.358	.240	.205	.278	.277	.281	.240
12	.278	-.411	.413	.393	.419	.359	.332	.349	.395	.379	.374	.395
13	.535	-.346	.592	.608	.617	.594	.507	.455	.563	.538	.568	.504
14		-.211	.440	.448	.438	.451	.346	.258	.422	.396	.336	.322
15			-.547	-.524	-.549	-.520	-.477	-.498	-.506	-.518	-.518	-.453
16				.966	.937	.923	.937	.860	.971	.929	.850	.776
17					.936	.939	.928	.845	.964	.921	.841	.782
18						.929	.902	.918	.921	.959	.906	.821
19							.902	.858	.921	.938	.853	.759
20								.871	.952	.919	.794	.721
21									.845	.930	.911	.818
22										.938	.832	.753
23											.909	.806
24												.838
25												

TABLE 20 (cont'd)

	26	27	28	29	30	31	32	33	34	35	36	37
1	.024	-.048	-.019	-.065	-.036	.012	-.024	-.027	-.046	-.154	.137	-.055
2	.384	.361	.301	.363	.360	.371	.359	.338	-.008	-.065	.145	-.056
3	-.121	-.097	-.178	-.119	-.128	-.193	-.081	-.092	-.067	-.014	-.007	.044
4	.154	.186	.099	.170	.124	.097	.134	.138	.094	-.145	.224	.130
5	.572	.523	.485	.523	.508	.553	.573	.542	.178	-.266	.286	-.207
6	-.008	.009	-.010	-.017	-.001	-.004	-.006	-.021	-.033	.045	-.123	-.044
7	-.160	-.128	-.048	-.112	-.096	-.123	-.201	-.216	-.069	.300	-.100	.057
8	.348	.325	.193	.291	.269	.288	.363	.313	.089	-.159	.369	-.048
9	-.239	-.188	-.157	-.195	-.183	-.154	-.236	-.301	-.140	.238	.009	.192
10	.326	.327	.216	.294	.335	.301	.397	.364	.087	-.313	.183	-.195
11	.290	.266	.179	.298	.270	.316	.326	.368	.203	-.094	.161	-.098
12	.401	.411	.330	.362	.342	.341	.392	.372	.103	-.335	.202	.058
13	.617	.552	.508	.553	.514	.545	.586	.594	.200	-.176	.278	-.271
14	.399	.318	.310	.349	.383	.426	.454	.408	.170	-.064	.366	-.278
15	-.483	-.537	-.458	-.505	-.487	-.445	-.511	-.528	-.216	.214	-.188	.162
16	.928	.853	.889	.896	.872	.775	.905	.911	.295	-.301	.210	-.303
17	.936	.846	.877	.892	.870	.790	.907	.910	.257	-.280	.222	-.340
18	.892	.899	.834	.941	.913	.838	.954	.952	.288	-.311	.207	-.260
19	.886	.839	.824	.915	.891	.825	.885	.903	.277	-.197	.222	-.294
20	.898	.790	.859	.872	.849	.739	.857	.893	.301	-.262	.155	-.344
21	.815	.921	.762	.929	.880	.777	.844	.875	.314	-.307	.120	-.148
22	.944	.829	.881	.885	.866	.765	.885	.902	.273	-.290	.185	-.337
23	.898	.904	.819	.942	.909	.799	.897	.935	.324	-.285	.161	-.248
24	.827	.943	.748	.907	.870	.761	.852	.874	.234	-.306	.172	-.146
25	.733	.847	.635	.812	.787	.662	.795	.787	.279	-.416	.139	-.185
26		.856	.861	.883	.836	.766	.838	.891	.254	-.210	.220	-.295
27			.751	.925	.884	.756	.842	.861	.238	-.287	.190	-.116
28				.815	.851	.759	.804	.799	.206	-.229	.165	-.261
29					.928	.830	.862	.911	.296	-.208	.183	-.177
30						.890	.881	.841	.222	-.229	.195	-.211
31							.794	.743	.195	-.153	.242	-.194
32								.885	.257	-.275	.228	-.249
33									.304	-.309	.154	-.302
34										-.028	.051	-.013
35											.056	.003
36												-.082
37												

TABLE 20 (cont'd)

	38	39	40	41	42	43	44	45	46	47	48	49	50
1	-.063	-.051	.041	.018	.136	-.020	-.085	.068	.207	.055	-.013	.066	.193
2	-.089	.055	.012	-.227	.241	-.055	-.089	.437	-.011	.093	-.210	.213	.210
3	.016	-.088	.002	-.012	-.068	.149	-.016	-.047	.024	-.069	.013	-.140	-.067
4	.100	-.028	-.035	-.081	.207	.079	-.137	.157	.098	-.107	.091	-.184	.117
5	-.229	.006	.040	-.240	.265	.026	-.250	.683	-.069	.127	-.153	.254	.263
6	.001	-.047	-.007	-.058	-.078	.015	.097	-.019	-.073	.093	-.149	-.012	.008
7	.090	-.024	-.077	-.002	-.160	.092	.259	-.308	.053	-.036	-.010	-.036	-.102
8	-.130	.025	-.003	-.115	.094	.081	-.240	.477	-.025	.012	-.138	.042	.171
9	.182	.078	-.060	.115	-.096	.050	.085	-.423	.165	-.242	.121	-.179	-.039
10	-.281	.016	.085	-.140	.168	.018	-.176	.456	-.090	.114	-.072	.237	.107
11	-.117	-.053	.027	-.102	.141	.013	-.095	.404	-.149	.033	-.056	.136	.163
12	.015	-.047	.060	-.166	.375	.037	-.278	.405	.197	.114	-.057	.260	.284
13	-.308	-.084	.031	-.358	.301	.151	-.259	.967	-.050	.102	-.243	.262	.254
14	-.386	-.062	.165	-.146	.128	.071	-.050	.559	-.003	.070	-.065	.207	.194
15	.109	.043	.036	.300	-.363	-.134	.171	-.316	-.142	.005	.193	-.377	-.319
16	-.314	-.077	.089	-.506	.388	.282	-.233	.572	.181	.168	-.097	.462	.355
17	-.339	-.066	.054	-.508	.383	.266	-.228	.593	.134	.185	-.094	.478	.338
18	-.257	-.056	.075	-.478	.452	.264	-.250	.599	.186	.159	-.112	.486	.359
19	-.291	-.091	.048	-.451	.370	.310	-.174	.578	.189	.134	-.112	.456	.308
20	-.344	-.185	.029	-.493	.373	.332	-.176	.477	.230	.163	-.070	.436	.317
21	-.103	-.070	.059	-.447	.476	.238	-.251	.436	.317	.182	-.044	.472	.287
22	-.338	-.094	.081	-.494	.376	.296	-.182	.536	.196	.174	-.061	.464	.314
23	-.234	-.106	.069	-.454	.417	.279	-.178	.519	.270	.153	-.079	.462	.297
24	-.112	-.068	.079	-.455	.434	.180	-.211	.547	.239	.161	-.093	.452	.280
25	-.094	-.143	.097	-.365	.409	.196	-.136	.488	.160	.312	.018	.501	.219
26	-.284	-.084	.067	-.421	.335	.262	-.231	.594	.188	.148	-.074	.421	.290
27	-.087	-.055	.082	-.414	.450	.189	-.269	.536	.275	.155	-.037	.473	.234
28	-.265	-.007	.062	-.456	.309	.249	-.187	.463	.146	.139	-.078	.440	.287
29	-.179	-.042	.040	-.434	.409	.263	-.247	.529	.292	.092	-.057	.451	.221
30	-.245	-.017	.072	-.398	.366	.224	-.207	.484	.250	.136	-.012	.498	.202
31	-.253	-.009	.061	-.334	.353	.137	-.246	.519	.173	.114	-.067	.495	.215
32	-.281	-.008	.057	-.446	.360	.234	-.245	.561	.135	.142	-.121	.478	.314
33	-.276	-.137	.066	-.477	.417	.264	-.204	.584	.172	.182	-.139	.413	.353
34	-.035	.003	-.092	-.145	.064	.059	-.144	.191	.048	-.063	.043	.078	.020
35	.013	.078	-.138	.129	-.253	-.029	.188	-.198	.022	-.253	-.005	-.133	-.253
36	-.145	.045	-.004	-.104	.172	.155	-.042	.263	.113	-.010	-.101	.066	.210
37	.750	.137	.021	.159	.064	-.140	-.060	-.276	.038	-.144	.077	-.099	-.192
38		.115	-.051	.129	.079	-.120	.085	-.318	.068	-.098	.070	-.096	-.170
39			.064	-.150	-.025	-.069	-.061	-.086	-.045	-.166	.037	.117	-.119
40				-.086	.102	-.133	-.051	.062	-.004	.030	.094	.160	.094
41					-.252	-.107	.144	-.347	-.158	-.063	.049	-.273	-.212
42						.076	-.196	.302	.193	.111	-.010	.352	.243
43							-.012	.143	.275	-.009	-.049	-.066	.053
44								-.258	-.071	-.104	-.083	-.108	-.237
45									-.043	.116	-.221	.218	.262
46										.077	.101	.086	.035
47											.137	.072	.094
48												-.072	-.198
49													.108
50													

PART III

Fiscal Relationships in Budget Decisions

CHAPTER SIX

PUBLIC EDUCATION AND LOCAL POLITICAL SYSTEMS

In this chapter and the next, we shall try to shed some light on the controversy over the proper relations between school government and other forms of local government. In the latter half of the nineteenth century, the activity of local governments increased to such a degree that the question arose whether or not they should be coordinated for purposes of efficiency and planning. Since at that time conflict frequently developed over whether schools should be incorporated into municipal government, the problem was resolved into whether or not school districts should be autonomous.

Before 1900, the controversy over school district autonomy had no distinct professional alignments, but in this century the lines were drawn between educators on the one hand, arguing for school district autonomy, and political scientists on the other hand, arguing for integration with local municipal government. And over this period, what had once been a very real question became scholastic disputation, far removed from the practical affairs of school administration and local government.

In this space, it is impossible to review in detail the philosophical assumptions from which proceed the two opposed theories, the one favoring school district autonomy or independence, the other favoring school district integration or dependence. We can only note in passing that the debate over the formal mechanism of local educational policy decision-making is in part a debate over the logical nature of the public interest. And accordingly it raises the question whether education is to be considered a social good--i.e., a good that benefits all persons within a given state or nation more or less equally--or a merit good--i.e., a good that is generally enough preferred in a given state or nation to be produced in the public sector, but one preferred in differential quantity and quality.[1/] Proponents of school district independence often argue that education is a social good, and that the public decision-making body should be a professional elite; their position implies a unitary conception of the public interest. Proponents of integration generally view education as a merit good and assume that each citizen's preference should be considered in formulating public policy; their position implies an individualistic or utilitarian concept of the public interest. However, the advocates of independence are by no means consistent in their arguments.

In this chapter we will focus on one aspect of the controversy, an aspect that has practical applications and deals with empirical issues: namely, the problem of efficiency in the administration of the educational enterprise, and the problem of political influence on the formulation of educational policy. If we assume that efficiency and a lack of political influence are desirable, the question becomes, to what degree does local school government structure affect the achievement of these ends. Advocates of school government dependence contend

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[1/] Richard A. Musgrave, The Theory of Public Finance (New York: McGraw-Hill, 1959), pp. 9-15.

that autonomy produces inefficiency; advocates of independence contend that integration brings about an unhealthy mating of education and politics.

Efficiency and the structure of local school governments

The drive for efficiency in local government began during the last decade of the nineteenth century. In 1900 Young argued that any subdivision of authority over local affairs necessarily led to administrative inefficiency; "in order to meet the demands of a rapidly growing population, school systems in our larger cities should have a more distinctly municipal form of organization."[2/] Rowe, in answering Young's argument, presented what he thought to be adequate evidence for the following assertion:

> It may be stated as a general principle that in those municipalities in which the school authorities have enjoyed independent powers of taxation, the adjustment of the educational system to the growing needs of the community has been more rapid than in the cities in which the schools have been dependent upon the annual appropriations of councils.[3/]

Clearly, Young was concerned with the administrative efficiency of local municipal or city governments; Rowe, on the other hand, was concerned with the efficiency of the local school system in adjusting to the "growing needs of the community."

[2/] James T. Young, "The Administration of City Schools," Annals of the American Academy of Political and Social Science, 15 (1900), pp. 171, 173-4.

[3/] L. S. Rowe, The Financial Relation of the Department of Education to City Government," Annals of the American Academy of Political and Social Science, 15 (1900), pp. 189-190.

No one so far has attempted to test Young's hypothesis concerning the effect of local school government structure on the efficiency of municipal or city governments. However, a number of research studies have been devoted to the impact of local school government structure on the efficiency of school operation. Elliott was the first to hypothesize that the structure of local school government is related to efficiency in obtaining local tax revenues for the schools,[4] but his hypothesis was not tested for some twenty years. The investigation was conducted by McGaughy, who used a sample of 377 cities, all having a population of 8,000 or more in 1920. His data were collected for the fiscal year 1919-20. He divided the districts in his sample into two groups: the dependent districts were those in which the school budget was approved by either a municipal agency or an agency from a higher echelon of government; the independent school districts were those in which the school board or the electorate had the authority to approve the school budget.

The first general conclusion McGaughy reached was that dependence and independence did not affect the amount spent per pupil in ADA:

> The average of the total expenses per pupil in the independent cities is $83.26; in the dependent cities this average is $84.29. To meet the statistical standard of significance, this difference would have to be almost ten times as great as it is. The conclusion is, therefore, that a city's average expense per pupil is in no way affected by the fact of the independence or dependence of its board of education with respect to the municipal authority of that city.

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[4] Edward C. Elliott, Some Fiscal Aspects of Public Education (New York: Teachers College, Columbia University, Contributions to Education No. 6, 1905).

However, it was found that there were differences in the patterns of expenditures in these two types of districts:

> Independent cities spend a greater amount per pupil in average daily attendance for the following five of the eight items of total expense: general control, maintenance, fixed charges, capital outlay and debt service.
>
> Dependent cities spend a greater amount for but one of the eight major items--instructional service. There is no difference between the expenses of the two groups for two of the eight items--operation of school plant and auxiliary services. When that part of the expense for auxiliary agencies which goes for health service is made a separate study, there is no evidence of a significant difference in the expenses of the two groups.

There are three major weaknesses in McGaughy's study. First, he did not attempt to distinguish between current expenditures and capital expenditures. He pointed out that:

> The current expense per pupil in dependent cities is greater than in independent cities. But in dependent cities there is a tendency for the municipal government to finance the debt service and capital outlay of the school system. This results in much heavier expense for these two functions in the independent than in the dependent cities.[5]

Second, the simple dichotomization of school districts into those which are dependent and those which are independent hides a number of structural variables that may have a contingent relationship to school expenditures.[6] Third, McGaughy's investigation can hardly be considered a test of Elliott's hypothesis. No account was taken of the socio-economic conditions that are now generally thought to be related to school expenditures, conditions which might have been particularly important for the years 1919 and 1920, when the postwar inflation and general economic confusion had a great impact upon the public sector of the American economy.

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[5] J. R. McGaughy, The Fiscal Administration of City School Systems (New York: McMillan Co., 1924). Quotations are from pp. 30, 46.

[6] See Chapter Seven.

A study made by Woodward in 1947 sought to correct the weaknesses in McGaughy's investigation. Using the corrected data issued by the U. S. Office of Education in its biennial surveys, Woodward examined the trends of financial support over a 16-year period. He divided his sample of 338 cities into three categories: independent school districts, in which the school budget was approved by either the electorate or the school board; dependent districts, in which a municipal agency approved the school budget; and special districts, in which either a county agency or a state agency approved the school budget. He found that the special districts received the lowest financial support throughout the period 1929-44. The dependent districts became increasingly more efficient in obtaining revenues for the schools during these years, while the independent districts generally occupied a middle position. However, the difference in expenditures between independent and dependent school districts was not statistically significant.[7/]

Commenting on Woodward's study, McLaughlin points out that when Woodward's dependent and special categories are combined, the

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[7/] H. B. Woodward, Jr., "The Effect of Fiscal Control on Current School Expenditures," Ph.D. dissertation (Teachers College, Columbia University, 1948), p. 23.

difference in expenditures largely disappears.[8] Viewed in this way, Woodward's findings corroborate those obtained in McGaughy's earlier investigation. However, the differences in expenditures between Woodward's special districts and the dependent districts may indicate that there are certain structural variables which a simple dichotomization hides.

In a study made in 1948 by Mort, a distinction was drawn between those districts in which the electorate decided upon a school budget and those in which the school board or a municipal agency decided upon it. Data were collected for two years, 1940 and 1947. It was found that average expenditures per pupil for both years were considerably higher in communities where the electorate decided upon the school budget.[9] However, as Mort himself points out, this finding might be suspect because comparative data on the ability to support schools from state to state were not taken into consideration. It should be noted that Mort's study once again indicates the importance of taking into account certain politico-structural variables in local school government arrangements that are hidden by a simple dichotomization of school districts into dependent and independent.

The weaknesses inherent in the three studies cited above will not permit a generalization of the findings. This point was made by the Educational Policies Commission in 1938:

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[8] Frederick C. McLaughlin, Fiscal and Administrative Control of City School Systems (New York: Public Education Association, 1949), p. 46.

[9] Paul R. Mort, "Voter Control versus Board Control of the Budget," School Executive, 70 (1951), pp. 34-37.

> The cities with fiscally independent boards of education do not spend more for education than is spent in cities under the other forms of control. The argument for fiscal independence does not rest upon the possibility of securing more generous support.[10/]

In other words, there is no evidence that one form of local school government rather than another is a necessary condition for greater efficiency in obtaining revenues for the schools.

If this is so, then at least one main argument of the advocates of school government dependence is unjustified. It has been argued that if school boards have a free hand in formulating the school budget, they will tend to act irresponsibly and push expenditures skyward, without attending to the requirements of municipal budgets. The findings of both Woodward and McGaughy, however, testify either to the intentional responsibility of independent boards of education or to their inability to act irresponsibly. It seems that giving boards of education the final responsibility to adopt a school budget does not present a danger to municipal budgets and tax programs.

It is sometimes pointed out that school expenditures are not an adequate measure of the efficiency of school operation. Mort and Cornell found that the coefficient of correlation between educational expenditures and an index of the adaptability of the schools to community needs is .59.[11/] They suggest that the adaptability of educational policy to community needs may be another measure of school operational efficiency.

[10/] Educational Policies Commission, The Structure and Administration of Education in American Democracy (Washington, D.C.: The Commission, 1938), p.50.

[11/] Paul R. Mort and Francis G. Cornell, American Schools in Transition (New York: Teachers College, Columbia University, 1941), p. 181.

Goodenow, a political scientist at Columbia University, argued in 1895 that in those cities where school governments were integrated with municipal governments, educational policies responsive to community preferences were most easily formulated and adopted. "There is no question that the adoption of the central administrative control has been of greatest benefit in the field of education." A decade later, Elliott, an educator, argued that the cleavage in local civic life caused by central school districts "must cease if our modern city life is to attain that efficiency demanded and desirable for real social progress."[12] On the other hand, Draper, the superintendent of schools in Cleveland, and Rollins, a political scientist, both argued that the mingling of municipal and educational functions made the school less adaptable to local needs.[13]

In 1922, Frasier reported an investigation that pertains to this argument from efficiency. He attempted to relate school government structure and the effectiveness of educational program in city schools. Nine classes of school districts were developed on the basis of the election and appointment of school board members and the school boards' powers in fiscal matters. These nine classes of school districts indicated various degrees of fiscal dependence and independence.

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[12] Frank J. Goodenow, Municipal Home Rule: A Study in Administration (London: MacMillan and Co., 1895), p. 84.
Elliott, p. 11.

[13] Andrew S. Draper, "Function of the State Touching Education," Educational Review, 15 (1898), p. 109.
Frank Rollins, School Administration in Municipal Government (New York: Faculty of Philosophy, 1902), p. 18.

Frasier's index for measuring the efficiency of city school systems was developed on the basis of six factors:

1. The percentage of 16 and 17-year old-children in school.
2. The percentage of elementary classes having fewer than 40 children enrolled.
3. The percentage of children having 60 square feet or more of playground space each.
4. The percentage of teachers having six or more years of training above the eighth grade.
5. The percentage of children enrolled who attend school all day and in adequate buildings owned by the city.
6. The percentage of the increased cost of living from 1913-14 to 1919-20 that was met by increased salaries for elementary women teachers.[14/]

Frasier established a coefficient of correlation for these various items in each school system and assigned an index number indicating the relative efficiency of each of the 164 cities he used in his sample.

He found there was a marked relationship between the degree of fiscal dependence and his coefficient of efficiency. There was a progressive declination in his index of efficiency as one moved from the independent to the more dependent type of fiscal arrangement. Furthermore, when he divided his sample of districts into two categories, those which were fiscally dependent and those which were fiscally independent,

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[14/] George W. Frasier, The Control of City School Finances (Milwaukee: Bruce Publishing Co., 1922), p. 68.

he found that

> The correlation by the above method between fiscal dependence and the school efficiency as measured by the index number, is -.27. This shows that there is a relationship, at least among the cities studied, between fiscal control and school efficiency. The fact that the correlation is definitely negative shows that a fiscally independent school system has a better chance to achieve success than one in which the finances are in the hands of the city government.[15/]

Two years later, McGaughy applied his elaborate statistical technique to Frasier's data. He classified the city school systems as dependent, independent, and special. For each type of system, he determined the central tendency with regard to each of the six factors making up Frasier's index of efficiency. In addition, he calculated the probable error in each group and the probable error in the difference of averages in the three groups of cities. He condluded that:

> Independent cities are much more successful in keeping their 16- and 17-year-old children in school than are dependent cities.
>
> Independent and special cities provide much more adequate playground space for each pupil than do dependent cities.
>
> In the dependent cities, a greater percentage of the women elementary teachers have had six or more years of training above the eighth grade than in the independent and special cities.
>
> Independent cities have a greater percentage of their pupils attending school all day, and in adequate buildings owned by the city, than have the dependent cities.
>
> Independent cities were more successful in adjusting teachers' salaries so that they kept pace with the increasing cost of living from 1913-14 to 1919-20 than were the dependent cities.
>
> Differences in the sizes of elementary school classes in the three groups of cities are probably not significant.[16/]

[15/] Ibid., p. 81.

[16/] See McGaughy, p. 54.

If there is no difference in the educational expenditures between fiscally independent and fiscally dependent school districts, then on the basis of Frasier's and McGaughy's investigations it would appear that fiscally independent school systems are spending their money more efficiently and effectively.

However, this conclusion cannot be stated with certainty. Frasier did not attempt to take out the effects of various socio-economic variables on the six factors in his index. It is much more realistic to suppose that the holding power of a school system depends on the educational preferences prevalent in the community rather than on the structural variables of local school government. Furthermore, the six specific measures Frasier employed can hardly be said to yield an adequate index of efficiency for an organization as complex as a city school system. Certainly under current conditions Frasier's index of efficiency would be of doubtful validity. Without a more adequate theory to explain his findings, he is not justified in attributing to school government structure the efficiency or inefficiency of local school systems, even on his index.

One other criterion for efficiency has been used, in a study by Carter and Sutthoff--namely, the success or failure of bond or tax elections in school districts. Two of their conclusions are relevant here: (1) in larger districts, appointed boards of education seem to be more efficient in obtaining acquiescence to bond issues; (2) in medium-sized districts in which the board has the final budget approving authority, bond and tax elections are most successful.[17] However, it should be noted that these conclusions are not firmly established by the data presented in this study.

The foregoing review of the research on the problem yields two conclusions. First, no adequate justification has been presented for the hypothesis that the politico-structural variables of local school government are in any way related to the efficiency of school systems. The theory from which this hypothesis is taken remains undeveloped, and the evidence relevant to it is inconclusive. Secondly, the analysis of the politico-structural variables involved in the problem is entirely inadequate.

Argument from Political Influence

Para-political processes have not been overlooked in the discussion of relations between school and municipal governments. Indeed, certain advocates of school government independence rest their entire case on the desirability of eliminating political influence from the processes of formulating and implementing educational policy.[18]

The advocates of local school government dependence, on the other hand, argue that political influence on school affairs is inevitable in a modern, urban, industrial society. If "bad politics" are to be kept out of local educational decision-making, then it is supposedly necessary for school boards to be given a departmental status in local municipal governments. Integration protects them from the welter of competing and contradictory demands made by various individuals, citizen groups, pressure groups, and interest groups, as well as by governmental agencies. In spite of the attempts over the last 75 years to articulate what might be called "the politics of education," there remains today a great lack of understanding of the problems of political influence in educational affairs.

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[17] Richard F. Carter and John Sutthoff, Communities and their Schools (Stanford: School of Education, Stanford University, 1960), pp. 99-105.

[18] See, for example, Educational Policies Commission, The Administration of Education in American Democracy, pp. 50-51.

The argument from political influence favoring local school government independence begins with the value assumption that it is desirable to "keep politics out of education and education out of politics." In and of itself, this assumption does not preclude the desirability of integrating local school and municipal or city governments. Rather, it is the empirical proposition that school government dependence inevitably or necessarily leads to a consideration of educational issues from narrow, self-regarding political motives that favors separation. There is no question that schools have suffered at the hands of politicians in isolated instances. The debate is over the general applicability of this proposition.

McLaughlin has put the argument as follows:

> Where non-school officials have the power to interfere, they usually will interfere. No aspect of the educational system is likely to be immune. The orderly hiring, promoting or transferring of school personnel will frequently be interrupted. The establishing of necessary supervisory positions which involve higher salary-brackets will not be tolerated. The reduction in class size to permit more adequate individual attention will be questioned. The value of guidance services, school social workers, and other specialists will not readily be appreciated. The importance of curriculum research and

> experiment, of visual and audial aids and other modern requisites for effective teaching will not be fully grasped. Repairs, rehabilitation and replacement of buildings will often be guided by political or other extraneous considerations rather than educational purpose.[19]

McLaughlin's argument has been stated many times over by such prominent educators as Draper, Elliott, Rollins, Frasier, Beard, Moore, and Cubberley.[20]

The advocates of local school government dependence often agree that it is desirable to attempt to separate education and self-regarding politics operationally. However, they do not agree that this separation is a necessary consequence of school government integration with municipal or city governments. Integration would have the effect of making political influence in school affairs more visible. Invisible politics, they argue, is rarely good politics. Henry and Kerwin contend that

> School superintendents of this country have battled against the meddling of their school boards much more frequently than the school boards have resisted the encroachment of politicians. Moreover, the politics with which the schools are beset at the present time are injected into the schools just as frequently by school boards as by representatives of the legislative or executive branches of political government. In addition, there are instances of tampering with the schools which involve the collusion between the school

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[19] McLaughlin, p. 51.

[20] Andrew S. Draper, "Plans of Organization for School Purposes in Large Cities," Educational Review, 6 (1893), pp. 2-3.
Elliott, p. 11; Rollins, p. 18; Frasier, pp. 86-87.
Charles A. Beard, The Unique Function of Education in American Democracy (Washington, D.C.: Educational Policies Commission, 1937), pp. 125-26.
E.C. Moore, How New York City Administers Its Schools (New York: n.p., 1912), p. 233.
E. P. Cubberley, Public School Administration (New York: n.p. 1916), pp. 104-412.

> board and a political machine. In fact, there is ground for the contention that an independent school board merely provides two possible sources of political interference instead of one.[21]

A study of the school systems in 90 of the largest cities in the United States led Henry and Kerwin to the following conclusion:

> The formative statements of reliable observers of school conditions in these cities make it perfectly clear that no particular structural pattern of school and city relationships constitutes a dependable safeguard against politics in the schools. The evidence is that some dependent school systems are free from political interference while others are not; the same is true of the wholly independent school system; and it is likewise true of school systems operated under intermediate degrees of municipal control.

In fact:

> The observations made in the course of this inquiry do not indicate that the schools are subjected to greater political pressure in those areas in which school and municipal services are administered cooperatively than in the situations in which the school authorities administhe same functions independently. On the other hand, the comments of both school and city authorities as well as those of other citizens interviewed in the cities visited support the view that cooperative endeavor on the part of school and municipal departments has improved the services of both organizations much more frequently than it has impaired the services of either.[22]

Thus, the heuristic arguments presented by Young, Horn, and Goodenow during the early part of this century are supported by research for the first time.[23/]

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[21] Nelson B. Henry and Jerome G. Kerwin, Schools and City Government (Chicago: University of Chicago Press, 1938), pp. 65-66.

[22] *Ibid.*, pp. 66, 92.

It should be noted that Henry and Kerwin offer very little documentation for the "no-difference hypothesis." The study is informal and impressionistic rather than systematic and rigorous. It is, however, the only effort made so far to examine the impact of local school government structure on the play of political forces in the process of formulating and implementing educational policy.

This treatment of the empirical issues in the controvery is not as complete or rigorous as it might be; yet it is abundantly clear that the subject of the place of the school in the community political system requires more systematic comparative research than it has received. Not only must the formalistic approach to the problem be further refined, but it must be complemented by an analysis of the operational realities and decision-making processes in the various formal settings. In our next chapter, we shall seek to lay the groundwork for such further study.

[23/] James T. Young, "The Administration of City Schools," Annals of the American Academy of Political and Social Science, 15 (1900), pp. 172-74.
P. W. Horn, "City Schools Under the Commission Form of City Government," Educational Review, 37 (1909), pp. 362-74.
Goodenow, pp. 83-85.

CHAPTER SEVEN

THE STRUCTURE OF LOCAL SCHOOL GOVERNMENTS: TOWARD A COMPARATIVE STUDY

In the previous chapter we examined the two theories regarding the formal relationship between school districts and muncipal governments, noticing both their historical development and their underlying assumptions and contradictions. It was suggested that the traditional dichotomization of local school governments into the categories of dependent and independent, or integrated and autonomous, is an oversimplification that leads to theoretical confusions. In this chapter, we will deal with a refinement of the structural variables involved in the functioning of local school governments, in order to arrive at what we hope will prove to be a more useful definition of "dependence" and "independence." What follows, however, is only a rough mapping of the direction that future studies on this problem might take.

The comparative study of local school governments faces difficulties with respect both to the selection of dimensions for comparison and the development of categories for comparison. The dimensions that have been used are the formal relationships of school governments on the one hand to state governments, and on the other hand to other local governments. Heretofore, the former set of relationships has been conceptualized in terms of the centralization-decentralization continuum.1/ The inter-local

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1/ John G. Fowlkes and George E. Watson, School Finance and Local Planning (Chicago: Midwest Administration Center, 1957).

governmental relationships have been dichotomized, from the standpoint of school governments, into dependence and independence categories. It is with the latter set of relationships and categories that this chapter will be concerned.

There are four types of local agencies that have legally defined roles in our public schools. The two most prominent are the electorate and the school board. In several states, such special-function agencies as the local judiciary, the board of school estimate, the city or municipal tax commission, the county budget agency, and local finance officers, as well as such multi-function agencies as the city, township, or municipal council, the mayor, and the board of supervisors, have some responsibility in local school government.

It is difficult to formulate the criteria by which to distinguish special-function and multi-function agencies. The main distinction may be stated as follows: a multi-function agency is one that is in a legitimate[2/] position to coordinate local public functions; a special-function agency is one that has authority only over a limited number of local public functions. In other words, a multi-function agency has ultimate legal responsibility for a span of public operation which is more inclusive than that of any other local governmental organization. Furthermore, a special-function agency may be a department of or responsible to a multi-function agency.[3/]

[2/] A "legitimate" action or state is one that has been sanctioned in some way. The sanction may be legal, where there exists a belief in the supremacy of law, or ethical, where there is a widely shared faith in the supremacy of some public ethic.

[3/] The distinction between special-function and multi-function agencies is potentially of theoretical significance.

A local school government consists of the agencies having a formally or legally defined role in formulating and implementing educational policy within a school district. When an agency has a role in the government of local schools, the nature of that role may be political, fiscal, or administrative, or some combination of the three. An agency's role is political when that agency is given the legal responsibility of electing or appointing another agency connected with local school government. When, for example, a local citizenry elects a school board, or a mayor appoints one, the citizenry or mayor are said to have a political role in local school government.

An agency's role is fiscal when that agency has the legal responsibility of reviewing or approving the school district budget or school operating tax rate.[4] An agency having the legal authority to suggest (but not to dictate) changes in the school budget or in the school tax rate is said to have budget or school-tax-review authority; it is in a legitimate position to bargain or struggle with the budget-approving agency over its suggested changes in the school budget. If it chooses to bargain, it will try to exact a quid pro quo; if it chooses to struggle, it will seek, informally, to acquire enough power to dictate a settlement. An agency having the legal power to dictate changes in the school budget is said to have budget-approval authority. Dictation occurs when one party or agency compels another to accept a settlement on its terms.[5] Agencies having only "rubber-stamp" fiscal functions in local school government, and at the same time lacking a political relationship to other agencies in local school government, are not theoretically interesting and will not be considered further.

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[4] We are not distinguishing between the two; i.e., "budget-review authority" is taken as being synonymous with "school tax-rate review authority" and "budget-approval authority" is taken as being synonymous with "school tax-rate approval authority."

An agency's role is administrative when it has the authority to participate directly in supervising or administering some aspect of school operation, e.g., selecting school employees, selecting school sites, planning school buildings, inspecting school buildings, collecting school tax revenues, having custody of school funds, disbursing school funds, and purchasing supplies and equipment.

The question arises as to what degree local agencies other than school boards are engaged in the government of local schools. In the survey White conducted, it was found that in all districts with an enrollment over 1,200 pupils, 85.9% of the school boards were elected, and 14.1% were appointed. The proportion of elected boards varied inversely with the size of the district, i.e., the smallest districts had a smaller proportion of appointed boards than did the larger districts. Over 90% of the school districts in the Northwestern, North Central, and Western states had elected boards, whereas only 61.7% of the districts in the South had elected boards.[6] The National Education Association study, reported in 1950, found that in the non-random sample of 1,892 city school districts, 87% of the school boards were elected.[7]

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[5] There are varying degrees of authority given to budget reviewing and approving agencies. In some instances, only the total amount of budget may be disputed or dictated; in others, only specific budget items may be disputed or dictated.

[6] A. L. White, Local School Boards: Organization and Practices, Washington, D.C.: U.S. Department of Health, Education and Welfare, 1962, pp. 8-10.

This same study pointed out that in 54% of the school districts, the school budget was not subject to review and approval by any agency other than the school board. It was found that in larger cities school budgets are subject to review by agencies other than the school board or the electorate more frequently than in smaller cities. It is not clear from the study, however, what proportion of districts subject their budgets to electoral review.[8] In 1924, McGaughy found that in 42.8% of all cities having a population of 30,000 or over, the school budget was approved by either the school board or the electorate; in the remaining 57.2%, the school budget was approved by either another local agency or a special county or state agency. In 1947, Woodward's study showed the percentages to be 41.3% and 56.9%, respectively; thus it seems that very little change took place between 1924 and 1947 in the fiscal relationships between the school boards and other agencies in the larger cities of this country.[9]

There are very few school districts in which agencies other than the school board have an administrative role in the government of local schools. In 1950, over 90% of the districts responding to the N.E.A.'s questionnaire indicated that complete authority for the selection of school personnel and purchasing was vested in the school board. Municipal agencies, however, were frequently involved in administering matters relevant to the district's building program.[10]

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[7] National Education Association, "Fiscal Authority of City School Boards," N.E.A. Research Bulletin 27 (1950), p.52.

[8] Ibid., p. 54.

[9] J. R. McGaughy, The Fiscal Administration of City School Systems, p. 5.

H. B. Woodward, Jr., The Effect of Fiscal Control on Current School Expenditures, p. 12.

In developing models for the comparative study of local school governments, these various formal relationships between the four types of agencies must be taken into account. The only study that has attempted to do this was conducted by Frasier, who, as we have seen, developed nine classes of school districts on the basis of the election and appointment of school board members, and the school boards' powers in financial matters.[11] His classification was entirely adequate for his sample since he arrived at it inductively. He took one dimension into consideration that is omitted here, namely the tax mandations and limitations set forth in the statutory law of the various states from which his sample of districts was taken. Moreover, he did not take into account the distinction between multi-function and special-function agencies and between budget-review authority and budget-approval authority. Whether these distinctions are important empirically is yet to be determined, but it seems that they are representative of some school districts and must therefore be considered when we formulate models for the comparative study of local school governments.

In order to develop reasonably adequate models of local school governments, the following assumptions will be made:

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[10] N.E.A., "Fiscal Authority of City School Boards," pp. 62-71.

[11] George W. Frasier, The Control of City School Finances, p. 43.

1. That only school boards have the authority to supervise the various aspects of school operation, i.e., that there are no agencies other than the school board having an administrative role in local school government;

2. That the professional administrative officers in the school's organization formulate the school budget;

3. That all school boards have either budget-review authority or budget-approval authority;

4. That all multi-function agencies are elected by the local citizenry; and

5. That all special-function agencies are either elected by the local citizenry or appointed by a local multi-function agency.

On these simplifying assumptions, we may define the fiscal roles and political origins of the agencies being considered, as shown in Table 21.

The separate descriptions given in Table 21 of the political origins and fiscal authority of each of the four agencies may now be combined. There are 324 possible combinations. From these logically possible combinations we may eliminate the following:

1. All those in which there is a duplication of authority to approve the school district budget;

2. All those in which no agency has the final authority to approve the school budget;

3. All those in which the multi-function agency has only the authority to review the school budget;[12]

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[12] Multi-function agencies with powers to review the school budget but without powers to approve it are rare, if not non-existent. For this reason, they may be eliminated from further consideration here.

TABLE 21

Agency	Political Origins	Fiscal Authority
A. School Boards	1. Elected	Budget review
	2. Elected	Budget approval
	3. Appointed by a special-function agency	Budget review
	4. Appointed by a special-function agency	Budget approval
	5. Appointed by a multi-function agency	Budget review
	6. Appointed by a multi-function agency	Budget approval
B. Special-Function Agencies	1. Elected	Budget review
	2. Elected	Budget approval
	3. Elected	No fiscal authority[a]
	4. Appointed by a multi-function agency	Budget review
	5. Appointed by a multi-function agency	Budget approval
	6. Appointed by a multi-function agency	No fiscal authority
C. Multi-Function Agencies	1. Elected	Budget review
	2. Elected	Budget approval
	3. Elected	No fiscal authority
D. Electorate[b]	1.	Budget review
	2.	Budget approval
	3.	No fiscal authority

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[a] Agencies having no authority over the school budget may nevertheless have a political relationship to the school board, i.e., they may be responsible for appointing members to such a board. This is the reason they are included in these descriptions.

[b] The election functions of the voters are accounted for in the descriptions of the other three agencies, and therefore need not be considered again.

4. All those in which the special-function agency has no fiscal authority and no authority to appoint the members of the school board. This process of elimination leaves 32 combinations, which are shown in the Models appearing on pages 169-73.

On the basis of the stipulated assumptions, this is a logical, though complex, set of descriptions of local school governments. To what extent these 32 models fit actual school government arrangements in the United States is yet to be determined. The available evidence suggests that most of these arrangements do exist. Not all school districts will come under one of these descriptions, however; the stipulated assumptions are too restrictive. But this logical development of models of local school governments gives us a vantage point from which to examine the traditional dichotomy between dependent or integrated and independent or autonomous school governments.

The relationship denoted by the word "dependence" is not one dimensional. As we have seen, there are at least three respects in which school boards may depend upon other local agencies. Dependence may be political, fiscal, or administrative. An attempt will now be made to examine the nature of these various dimensions of the dependence relationship.

Fiscal dependence of school governments has received the most attention in the literature. Customarily, fiscally dependent and fiscally independent school systems are distinguished as follows:[13/] (to page 174)

[13/] Carter V. Goode, ed., Dictionary of Education (New York: McGraw-Hill, 1945).

MODELS OF LOCAL SCHOOL GOVERNMENTS

The solid arrow (——>) in these descriptions designates the election and appointment relations; the dotted arrow (--->) points to the agencies having the power of budget review; and underlining designates the budget-approving agency.

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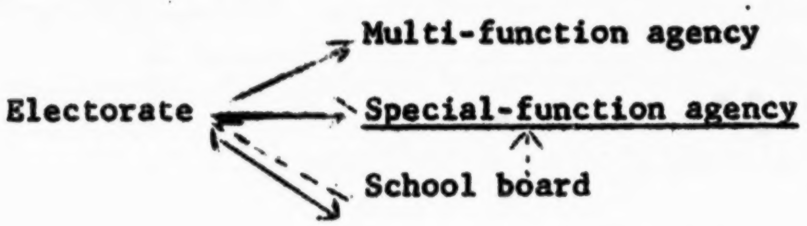
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Electorate
Special-function agency
School board

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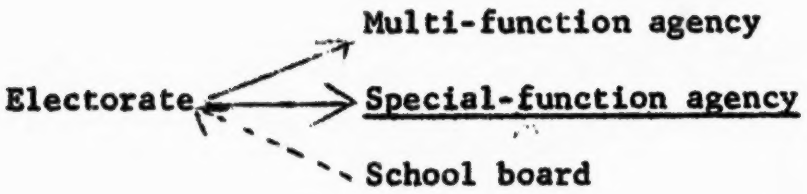
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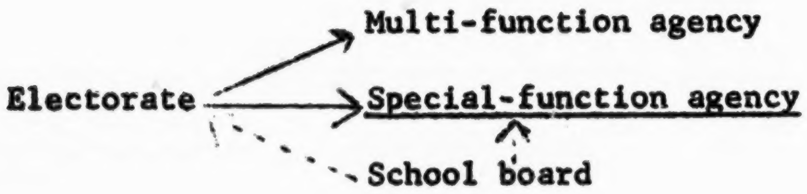
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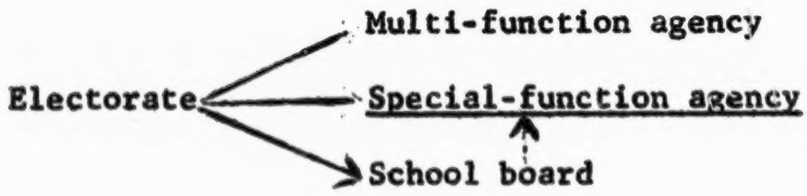
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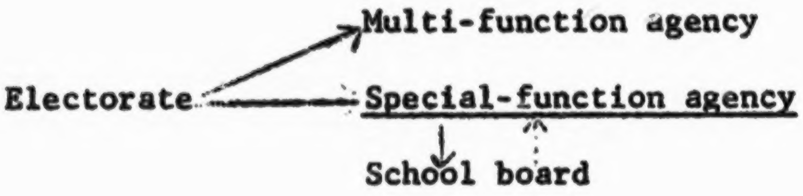
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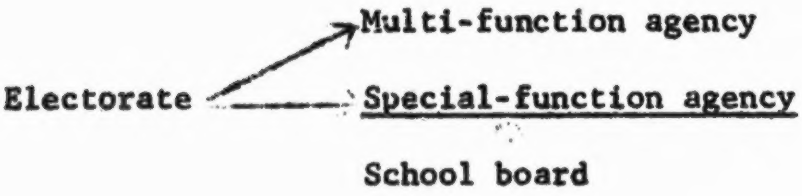
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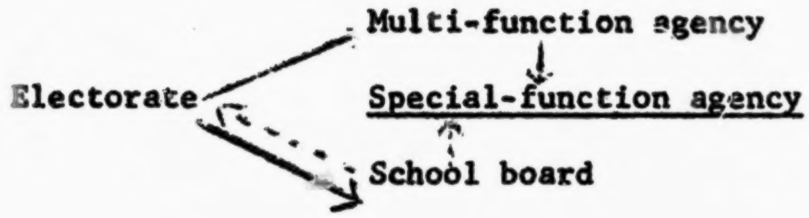
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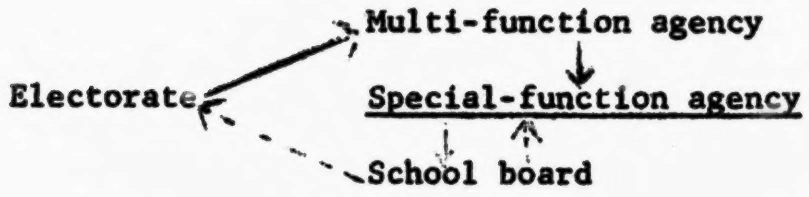
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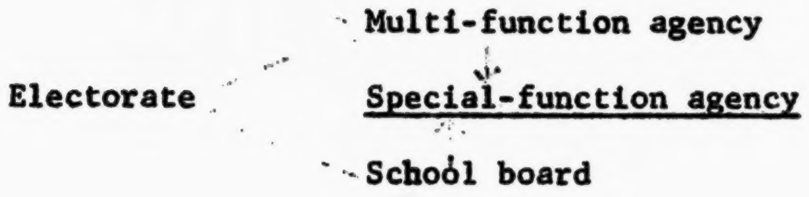
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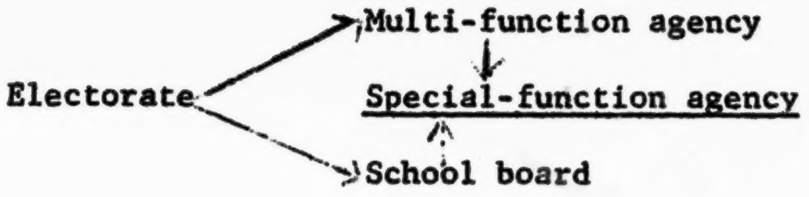
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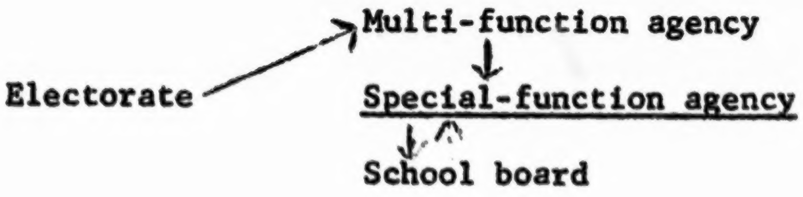
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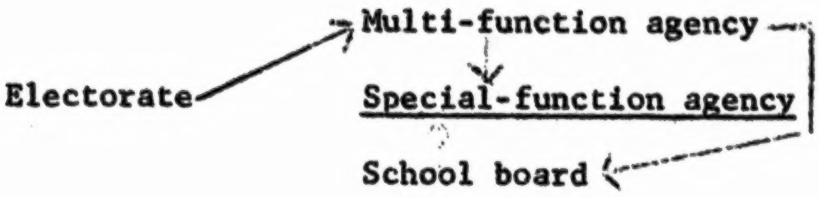
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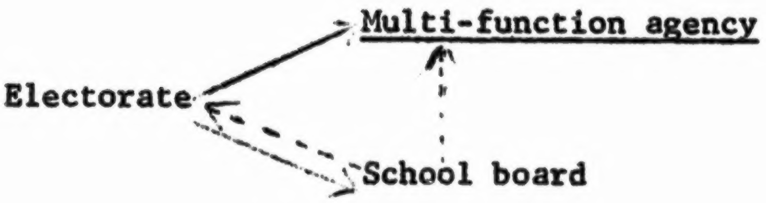
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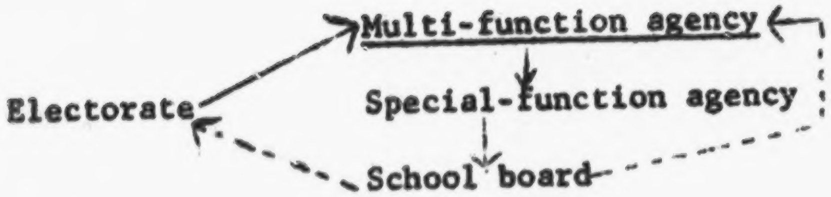
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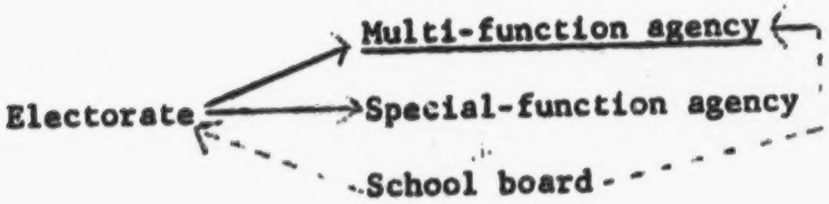
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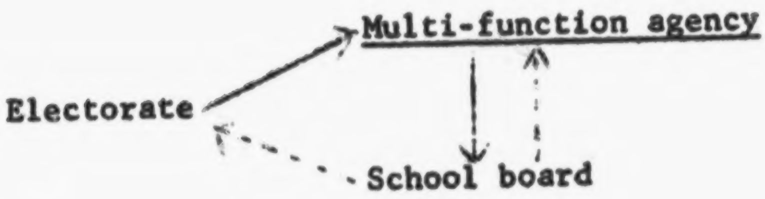
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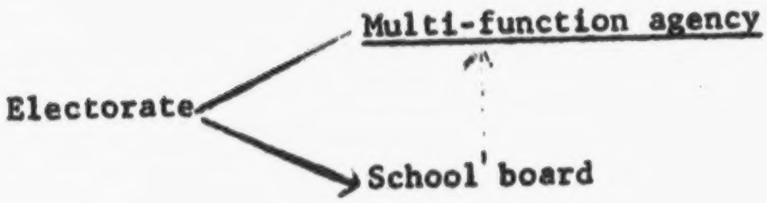
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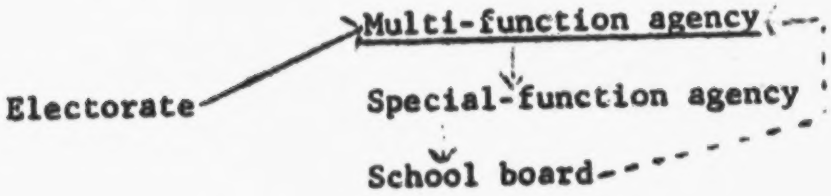
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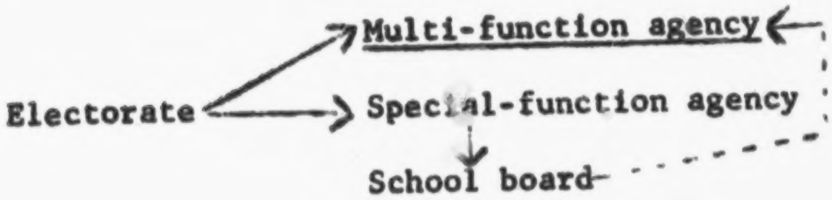
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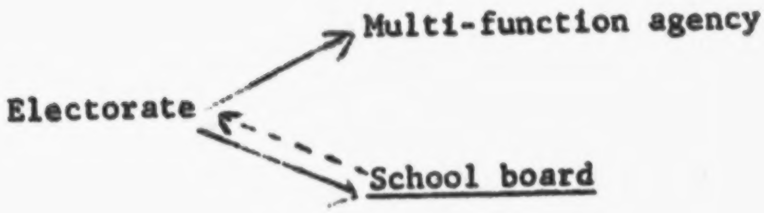
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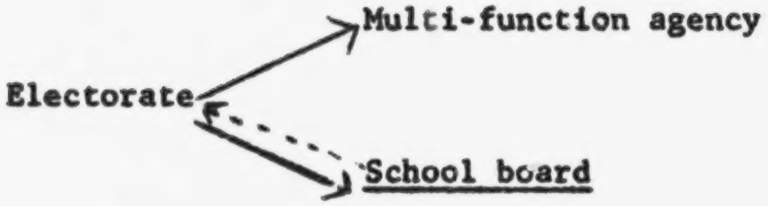
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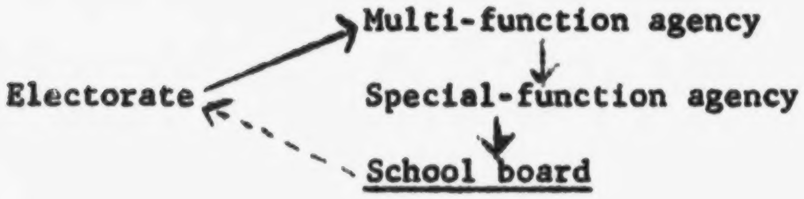
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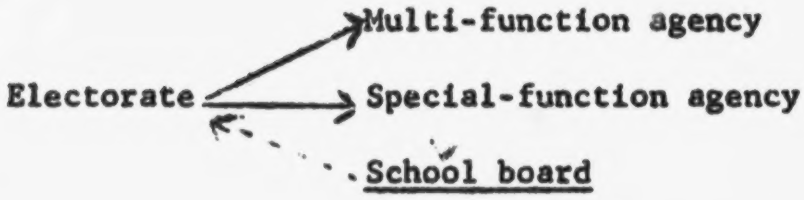
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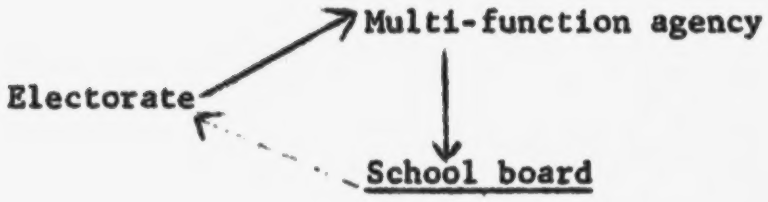
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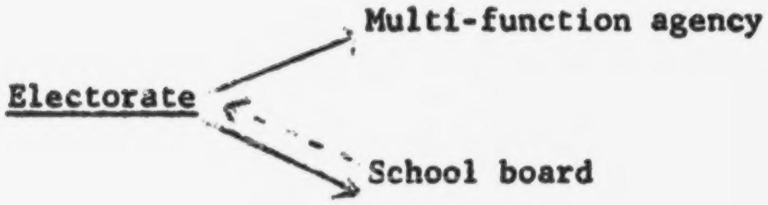
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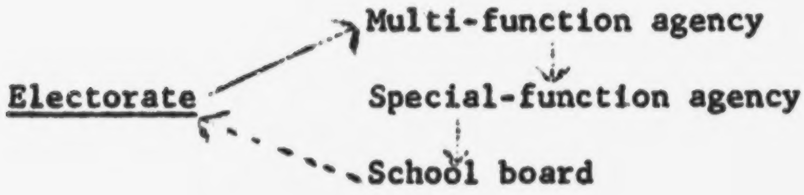
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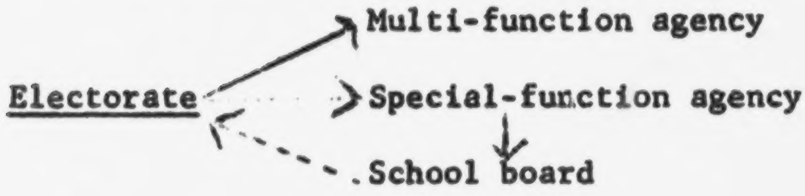
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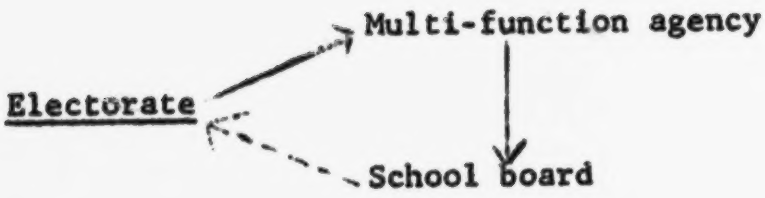
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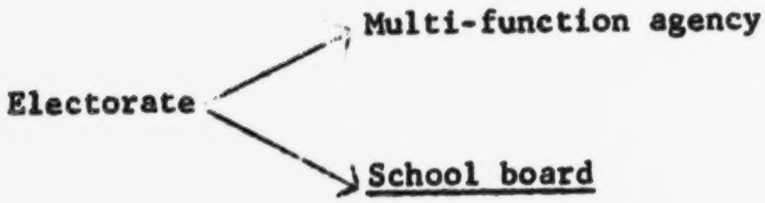
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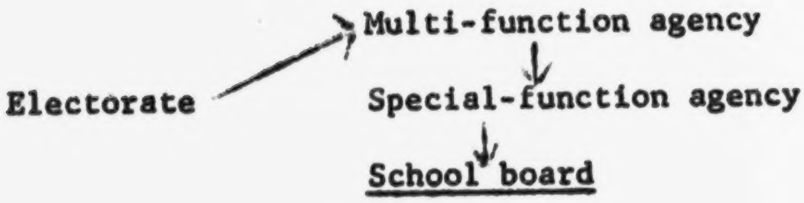
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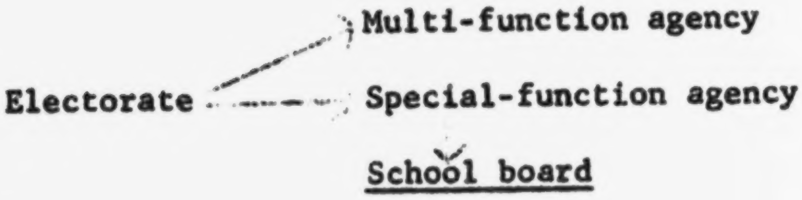
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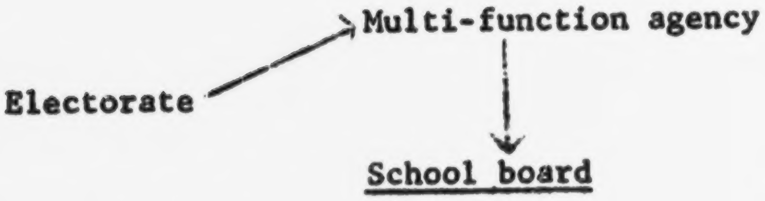
Multi-function agency
Electorate
School board

> Fiscally independent system: a school system in which the state has delegated to the board of education complete authority in all matters pertaining to the financial management of public schools, the board having the power to determine the amount of the budget and to levy or cause to be levied to raise the required funds.
>
> Fiscally dependent system: a school system in which the board of education cannot make estimates and decisions in financial matters without the approval of and control by municipal authorities.

Models 21-24 and 29-32, shown above, come under the definition of "fiscal independence;" models 1-20 come under the definition of "fiscal dependence," allowing all special-function and multi-function agencies to be "municipal authorities." Neither of these definitions says anything about models 25-28, in which the electorate has budget-approval authority. It could be argued that the school board in models 25-28 is fiscally dependent upon the voters. But this, it should be noted, is a very different kind of dependence than that described in the definition given above.

This problem does not arise in the case of political or administrative dependence. The school board is always politically dependent on some local agency, unless, of course, it is appointed by an agency of a higher echelon of government, e.g., the state legislature. The school board is politically dependent on either the electorate, a special-function agency, or a multi-function agency in the models shown above. In the case of administrative dependence, the board's dependence is always upon a special-function or multi-function agency. The electorate does not have legally defined administrative functions in implementing educational policy.

In our review of the history of the controversy over local school government structure, it was apparent that there has been very little agreement on the criteria of independence or autonomy. If a general category of independent school districts is wanted, it would seem that the following three criteria would describe the necessary conditions of this category:

(1) The school board is appointed by an agency of the next higher echelon of government;

(2) This school board has complete freedom in the determination of the school district budget and may cause to have levied the necessary tax rate;

(3) The school board has, within the framework established by statutory mandations and prohibitions, freedom to determine and implement educational policy in the way in which it deems best.

In other words, an independent school government has no legally defined relationship to any one of the other three types of local agencies that we have discussed. If the local school government has a legally defined, formal relationship to another agency of local government, be that agency the electorate or a special-function or multi-function agency of municipal government, then it is a dependent school government insofar as that relationship is concerned. It should be noted that on the basis of these three criteria, none of the models developed above have independent school governments. Indeed, in the United States there are probably very few school boards that are appointed by agencies from higher echelons of government, i.e., county or state governments.

On the basis of this definition of school government independence, it would seem that the controversy over school district and municipal or city government relations is a debate over which agencies local school governments should be dependent upon and in what respects there should be a formally or legally defined integration or coordination of functions. Or, to state the problem in other words, to what extent and in what respects should the mechanism for the formulation and implementation of educational policy be formally centralized or decentralized? To what extent should control over school policy be pyramided, and to what extent should it be fragmented and distributed among various local agencies? Answers to these questions can be justified only by bringing certain empirical conditions under some general moral principle -- some conception of the public good. This philosophical issue has been alluded to in the previous chapter.

The foregoing analysis left us with too many variables to deal with empirically within the limits of resources available for this study. However, we did extend our analysis of expenditures of the districts in our ten-state sample to see whether a dichotomous treatment of our data would yield further information. Districts in which the school budget is approved by the voters directly or through an elected school board were classified as fiscally independent. Districts in which the budget is approved by an appointed school board or by some other governmental unit were classified as fiscally dependent. Thus our "independent" districts comprise cases 21 to 32; while cases 1 to 20 would be classified as "dependent." By this criterion, our sample of 589 districts in ten states consisted of 146 dependent districts and 443 independent districts (see Table 22).

In our statistical analysis, we found a tendency for independent districts to spend somewhat more on education than dependent districts; however, the issue is not clear-cut since other factors may have influenced the results -- particularly the fact that New York's six dependent districts are also located in the six largest cities of the state. For a more detailed analysis, the reader should refer to Table 11 and Chart 21, pp. 96, 97, and the accompanying text.

TABLE 22

Fiscal Classification of Districts in Ten-State Sample

State	Number of Districts Dependent Districts	 Independent Districts	 All Districts
California	--	52*	52
Massachusetts	39*	44*	83*
Nebraska	--	17*	17
New Hampshire	7	5	12
New Jersey	37*	71*	108*
New Mexico	23*	--	23
New York	6	169	175*
Oregon	--	26*	26
Washington	--	47*	47
Wisconsin	34	12	46*
Ten States	146	443	589*

* An asterisk (*) indicates the samples for which multiple regressions were computed.

REFERENCES

1. *Baker et al.* v. *Carr et al.* 82 S.Ct. 691 (1962)

2. Baker, Gordon E., *Rural Versus Urban Political Power*, Doubleday, Short Studies in Political Science No. 20, New York, 1955.

3. Barnard, C. E., *The Functions of the Executive*, Harvard University Press, Cambridge, 1938.

4. Beard, Charles A., *The Unique Function of Education in American Democracy*, Educational Policies Commission, Washington, D.C., 1937.

5. Becker, Gary S., "Underinvestment in College Education," *Proceedings, American Economic Review* (May, 1960).

6. Benson, Charles S., *The Economics of Public Education*, Houghton-Mifflin, Boston, 1961.

7. Carter, Richard F., *Voters and Their Schools*, Stanford University Press, Stanford, 1960.

8. Carter, Richard F., and Sutthoff, John, *Communities and Their Schools*, Stanford University Press, Stanford, 1960.

9. Crandall, James H., "A Study of Academic Achievement and Expenditures for Instruction," Unpublished Ed.D. Dissertation, University of California, Berkeley, 1961.

10. Cubberley, E. P., *Public School Administration*, n.p., New York, 1916.

11. Dauer, Manning J. and Kelsay, Robert S., "Unrepresentative States," *National Municipal Review*, Vol. 44, Dec. 1955.

12. David, Paul T. and Eisenberg, Ralph, *Devaluation of the Urban and Suburban Vote*, Bureau of Public Administration, University of Virginia, 1961.

13. Davis, Donald L., "Taxpaying Ability: A Study of the Relationship Between Wealth and Income in California Counties," Unpublished Ed.D. Dissertation, School of Education, Stanford University, Stanford, 1963.

14. Denison, Edward, *Economic Growth in the United States and the Alternatives Before Us*, Committee for Economic Development, New York, 1962.

15. Downey, Lawrence W., *The Task of Public Education*, Midwest Administration Center, The University of Chicago, Chicago, 1960.

16. Draper, Andrew S., "Plans of Organization for School Purposes in Large Cities," Educational Review, Vol. 6, 1893.

17. Draper, Andrew S., "Function of the State Touching Education," Educational Review, Vol. 15, 1898.

18. Dubois, Phillip H., Multivariate Correlational Analysis, Harper and Brothers, New York, 1957.

19. Eckstein, Otto, Water Resource Development, Harvard University Press, Cambridge, 1958.

20. Educational Policies Commission, The Structure and Administration of Education in American Democracy, The Commission, Washington, D.C., 1938.

21. Educational Policies Commission, The Central Purpose of American Education, National Education Association, Washington, D.C., 1961.

22. Elliott, Edward C., Some Fiscal Aspects of Public Education, Contributions to Education No. 6, Teachers College, Columbia University, New York, 1905.

23. Faris, Robert E. L., "Reflections on the Ability Dimension in Human Society," American Sociological Review, December, 1961.

24. Fowlkes, John G. and Watson, George E., School Finance and Local Planning, Midwest Administration Center, The University of Chicago, Chicago, 1957.

25. Frasier, George W., The Control of City School Finances, Bruce Publishing Co., Milwaukee, 1922.

26. Goode, Carter V., ed., Dictionary of Education, McGraw Hill, New York, 1945.

27. Goodenow, Frank J., Municipal Home Rule: A Study in Administration, MacMillan and Co., London, 1895.

28. Hanson, Nels, "Economy of Scale in Education: An Analysis of the Relationship Between District Size and Unit Costs in the Public Schools," Unpublished Ed.D. Dissertation, School of Education, Stanford University, Stanford, 1963.

29. Henry, Nelson B and Kerwin, Jerome G., Schools and City Government, University of Chicago Press, Chicago, 1938.

30. Hitch, Charles J. and McKean, Roland N., The Economics of Defense in the Nuclear Age, Harvard University Press, Cambridge, 1960.

31. Horn, P. W., "City Schools Under the Commission Form of City Government," Educational Review, Vol. 37, 1909.

32. Houthakker, H. S., "Education and Income," The Review of Economics and Statistics, February, 1959.

33. James, H. Thomas, School Revenue Systems in Five States, Stanford University, Stanford, 1961.

34. James, H. Thomas, "Toward a Unified Concept of State School Finance Systems," Unpublished Ph.D. Dissertation, University of Chicago, Chicago, 1958.

35. Kershaw, Joseph A. and McKean, Roland N., "Systems Analysis and Education," Research Memorandum, The Rand Corporation, Santa Monica, 1959.

36. Kershaw, Joseph A. and McKean, Roland N., "How to Make School Decisions: An Outsider's View," School Management, May, 1960.

37. Krutilla, John V. and Eckstein, Otto, Multiple Purpose River Development, Johns Hopkins Press, Baltimore, 1958.

38. McGaughy, J. R., The Fiscal Administration of City School Systems, MacMillan, New York, 1924.

39. McLaughlin, Frederick C., Fiscal and Administrative Control of City School Systems, Public Education Association, New York, 1949.

40. Miller, Herman P., "Annual and Lifetime Income in Relation to Education: 1939-59," American Economic Review, December, 1960.

41. Miner, Jerry, Social and Economic Factors in Spending for Public Education, Syracuse University Press, Syracuse, June, 1963.

42. Moore, E. C., How New York City Administers Its Schools, n.p., New York, 1912.

43. Mort, Paul R., "Voter Control versus Board Control of the Budget," School Executive, Vol. 70, 1951.

44. Mort, Paul R. and Cornell, Francis G., American Schools in Transition, Teachers College, Columbia University, New York, 1941.

45. Mort, Paul R., Reusser, Walter C., and Polley, John W., Public School Finance, McGraw-Hill, New York, 1960.

46. Musgrave, Richard A., The Theory of Public Finance, McGraw-Hill, New York, 1959.

47. National Education Association, "Fiscal Authority of City School Boards," *NEA Research 27*, 1950.

48. NEA Research Report 1959, *Rankings of the States*, National Education Association, Washington, April, 1959.

49. Orr, David B., "Selected Characteristics of American High Schools," Mimeographed, University of Pittsburgh Project TALENT, February, 1962.

50. Project TALENT, "A National Inventory of Aptitudes and Abilities," School Questionnaire, General School Characteristics, University of Pittsburgh, 1960.

51. Project TALENT, "The Tests of Project TALENT," Bulletin No. 3, University of Pittsburgh, 1960.

52. Renshaw, Edward F., "A Note on the Expenditure Effect of State Aid to Education," *The Journal of Political Economy*, April, 1960.

53. Rollins, Frank, *School Administration in Municipal Government*, Faculty of Philosophy, New York, 1902.

54. Rolph, Earl R. and Break, George F., *Public Finance*, The Ronald Press Company, New York, 1961.

55. Ross, Donald H. et al., *Administration for Adaptability*, Vols. I, II, III, IV, Columbia University, New York, 1951.

56. Rowe, L.S., "The Financial Relation of the Department of Education to City Government," *Annals of the American Academy of Political and Social Science*, Vol. 15, 1900.

57. Schultz, Theodore W., "Education and Economic Growth," *Social Forces Influencing American Education*, Sixtieth Yearbook National Society for the Study of Education, Part II, The University of Chicago Press, 1961.

58. Simon, Herbert A., "A Comparison of Organization Theories," and "A Behavioral Model of Rational Choice," *Models of Man*, Wiley, New York, 1957.

59. Simon, Herbert A., *Administrative Behavior*, 2d ed., MacMillan, New York, 1961.

60. Svennilson, Ingvar, Edding, Friederich, and Elvin, Lionel, "Targets for Education in Europe in 1970," A paper prepared for the Policy Conference on Economic Growth and Investment in Education, sponsored by the Organisation for European Economic Cooperation, in Washington, October 16-20, 1961.

61. Thomas, J. Alan, "Efficiency in Education: A Study of the Relationship Between Selected Inputs and Test Scores in a Sample of Senior High Schools," Unpublished Ph.D. Dissertation, Stanford University, Stanford, 1962.

62. U. S. Department of Commerce, Bureau of the Census, Census of Housing: 1960, States and Small Areas, U.S. Government Printing Office, Washington, D. C., 1962.

63. U. S. Department of Commerce, Bureau of the Census, Census of Population: 1960, General Population Characteristics, States, U. S. Government Printing Office, Washington, D. C., 1962.

64. U. S. Department of Commerce, Bureau of the Census, Census of Population: 1960, General Social and Economic Characteristics, States, U. S. Government Printing Office, Washington, D.C., 1962.

65. Vaizey, John, The Economics of Education, The Free Press of Glencoe, New York, 1962.

66. White, A. L. Local School Boards: Organization and Practices, U. S. Department of Health, Education and Welfare, Washington, D.C., 1962.

67. Wolfle, Dael, America's Resources of Specialized Talent, Harper Brothers, New York, 1954.

68. Woodward, H.B., Jr., "The Effect of Fiscal Control on Current School Expenditures," Unpublished Ph.D. Dissertation, Teachers College, Columbia University, 1948.

69. Young, James T., "The Administration of City Schools, Annals of the American Academy of Political and Social Science, Vol. 15, 1900.

APPENDIX A

This Appendix presents additional information on the terms and the data used in making the tests for equality and initiative reported in Chapter Two. Readers interested in a more extended discussion of the terms are referred to Appendix A of the previous study,[1/] which also contains the data on California, Nebraska, New Jersey, Washington, and Wisconsin. This Appendix reports the basic data for Massachusetts, New Hampshire, New Mexico, New York, and Oregon.

Four items of information from each district were required for the tests discussed in Chapter Two. These items were (1) the required levy rate; (2) the current expense per pupil; (3) the voluntary levy rate; and (4) the voluntary expenditure per pupil. All data used in developing these items were for the 1958-59 school year.

The required levy rate was obtained by dividing a district's net current expense by the equalized valuation of taxable property.

Net current expense is defined as that portion of current expense (total current expense for full-time elementary and secondary day schools as defined in "The Common Core of State Educational Information," U.S. Office of Education) which remains to be paid from local tax receipts after all other revenues applicable to current expense, such as Federal, state and county aids, tuition transfers and payments by pupils, have been deducted.

[1/] School Revenue Systems in Five States, Op. Cit.

Current expense data are published for Massachusetts[2] and New York.[3] Those for New Hampshire are shown in Appendix Table IV, for New Mexico in Table I and for Oregon in Table II.

We were able to derive net current expense by deducting from current expense the receipts shown in published reports except in Oregon, where special summaries prepared by the State Department of Education were used, and in New Mexico, where individual questionnaires from each district were obtained. The resulting new current expense for the districts in each state is shown in Appendix Tables III through VII.

The equalized valuations of property are derived from assessed valuations. In each of the states included in this study an agency of state government reviewed the assessments of local tax districts and determined the relationship of those assessments to estimated full value of property, thus adjusting assessed values for the effects of variations in local assessment policy and systematic biases of local assessors.

The full equalized valuation for each district was obtained from published sources for New York,[4] Oregon,[5] New Hampshire,[6] and

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[2] Massachusetts Department of Education "Annual Report of the Department of Education for the Year Ending June 30, 1959" Public Document No. 2, Part II, Boston: The Department, 1960.

[3] Arthur Levitt, Financial Data for School Districts, Albany: Department of Audit and Control, 1960; pp. 10-70.

[4] *Ibid*.

[5] Rex Putnam, Apportionment of the Basic School Support Fund for the Year Ending June 30, 1959, Salem: State Department of Education, 1959.

[6] New Hampshire Department of Education, 1958, Equalized Valuation Per Pupil, 1958-59, of New Hampshire Districts (Concord: Division of Administration, No. 4530, Aug. 1960.

Massachusetts.[7] These data were obtained from a special report in New Mexico[8] and are reproduced along with the reported assessment ratios in Appendix Table I.

The average daily attendance for each district is published for Massachusetts,[9] New Hampshire,[10] New York,[11] and New Mexico,[12] while that for Oregon was obtained from a special summary prepared by the State Department of Education, and is reported in Appendix Table II. Resident ADA, used in computing voluntary expenditures per pupil, was obtained by deducting the non-resident enrollment in each district from the total ADA. The non-resident enrollment was obtained by special report from New Mexico, Oregon and New York, and the resulting resident ADA is shown respectively in Appendix Tables I, II, and VI.

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[7] Massachusetts State Tax Commission, Biennial Report of the State Tax Commission Upon the Equalization and Apportionment of State and County Taxes; Boston: Wright and Potter Printing Co., 1959; House 2833. pp. 15-24.

[8] School Finance Study Committee, Department of Education, Report to Legislative Finance Committee, Santa Fe: December, 1961.

[9] Massachusetts, Annual Report of the Department of Education, op. cit., pp. 5-33, 61 and 89.

[10] New Hampshire State Department of Education, 1958-59, Average Daily Membership Based Upon Attendance and Residence; Concord: Division of Administration, mimeographed, unbound, No. 4788, January, 1961.

[11] Part III of the Fifty-Sixth Annual Statistical Report of the Education Department, Albany: The State Education Department, September, 1960, Table 59, pp. 115-120.

[12] Tom Wiley, State Superintendent of Public Instruction, Annual Statistical Report on New Mexico Schools for the Period July 1, 1958 to June 30, 1959, Santa Fe: State Department of Education, 1960.

Tables III through VII report the following derived data upon which the tests in Chapter Two were based for each district, by states: net current expense, required levy rate, and full value mandated rate for those states in which the rate is not uniform for all districts, and voluntary expenditures per pupil.

APPENDIX - TABLE I

Full Equalized Valuations, Assessment Ratios, Resident ADA, Total Current Expense, and Expenditures Per Pupil of Selected New Mexico School Districts, 1958-59

County & District		Full Equalized Valuation (thousands)	Assessment Ratio	Resident ADA	Total Current Expense (thousands)	Current Expense Per ADA
Bernalillo						
	Albuquerque	1,045,258	19.4	46737	13606	291
Chaves	Roswell	229,759	17.6	7845	2300	286
Colfax	Raton	36,897	30.8	1918	682	356
Curry	Clovis	129,069	22.8	5023	1733	345
Dona Ana						
	Las Cruces	180,893	22.1	9208	2706	294
	Gadsden	105,638	29.3	2594	957	357
Eddy	Carlsbad	261,226	25.6	7685	2787	360
	Artesia	198,943	24.6	3986	1416	355
Grant	Cobre	86,630	38.4	2550	984	386
Lea	Lovington	168,585	30.4	3033	1352	446
	Hobbs	216,435	26.8	6610	2426	366
Los Alamos						
	Los Alamos	10,981	36.2	3331	1504	452
Luna	Deming	106,004	24.8	2401	892	367
McKinley						
	Gallup	200,333	27.9	5229	1960	375
Otero	Alamagordo	111,452	25.5	5916	1809	306
Quay	Tucumcari	53,549	24.1	2158	706	327
Rio Arriba						
	Espanola	15,646	16.5	1615	526	326
Roosevelt						
	Portales	57,908	17.6	2496	825	331
San Juan						
	Aztec	56,360	23.6	1918	715	351
	Farmington	185,913	20.2	5532	1589	287
	Kirtland Central	38,706	26.0	1689	579	343
San Miguel						
	Las Vegas Town	8,388	26.2	1508	472	313
	Las Vegas City	30,547	25.3	1907	703	315
Santa Fe						
	Santa Fe	180,448	23.1	6214	1991	320
Socorro	Socorro	23,769	27.4	1581	522	330
Taos	Taos	14,343	25.4	1228	568	349
Valencia						
	Belen	29,296	27.7	2500	829	332
	Grants	120,896	32.2	4170	1305	313

APPENDIX - TABLE II

Total ADA, Resident ADA, Total Current Expense, and Current Expense per ADA in Selected Oregon School Districts, 1958-59

County	District	Total ADA	Resident ADA	Total Current Expense (thousands)	Current Expense Per ADA
Baker	Baker	2076	2019	712	343
Benton	Corvallis	4408	4382	1,684	382
Clackamas	West Linn	1806	1544	825	457
	Lake Oswego	2843	2842	1,193	419
	Oregon City	3236	3234	1,288	398
Clatsop	Astoria	2031	1861	845	416
Columbia	St. Helens	1751	1751	700	403
Coos	Coquille	1427	1368	579	406
	Coos Bay	4669	4619	1,973	423
	North Bend	1740	1590	858	493
Crook	County Unit	2289	2289	814	356
Deschutes	Bend	2724	2690	1,052	386
Douglas	Roseburg	5089	5078	2,039	401
Hood River	County Unit	1946	1932	858	441
Jackson	Ashland	2324	2317	752	324
	Central Point	2021	1925	828	410
	Medford	6829	6486	2,836	415
Josephine	County Unit	2267	2256	980	432
	Grants Pass	4059	3323	1,432	353
Klamath	County Unit	5131	5131	1,970	384
Lane	Eugene	11768	11763	4,544	386
	Springfield	6013	6010	2,162	360
	Bethel	2147	2136	912	425
Lincoln	County Unit	4964	4907	1,938	390
Malheur	Ontario	2084	2067	684	328
Marion	Salem	13802	13578	4,974	360
Multnomah	Portland	63289	62818	24,945	394
	Parkrose	3369	3369	1,410	419
	Reynolds	1672	1668	757	453
Polk	Dallas	1581	1431	584	369
Tillamook	Tillamook	2036	2036	795	390
Umatilla	Hermiston	1827	1818	779	426
	Pendleton	3220	3167	1,285	399
Union	La Grande	2286	2191	730	320
Wasco	The Dalles	2424	2265	828	341
Yamhill	McMinnville	2006	1964	737	368

APPENDIX - TABLE III

Net Current Expense, Required Levy Rate, Full-Value Mandated Levy Rate, and Voluntary Expenditure Per Pupil for Selected Massachusetts School Districts, 1958-59

County	District	Net Current Expense (thousands)	Required Levy Rate (in mills)	Full-Value Mandated Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Barnstable	Barnstable	856	5.0	1.6	$238
	Bourne	393	7.7	4.4	87
	Falmouth	737	6.8	2.8	167
Berkshire	Adams	372	9.2	4.8	104
	North Adams	820	14.7	5.8	178
	Pittsfield	279	12.0	5.2	165
Bristol	Attleboro	1073	10.7	4.9	134
	Dartmouth	732	11.3	4.6	169
	Easton	461	16.0	7.7	126
	Fairhaven	486	9.4	4.9	106
	Fall River	2755	10.2	5.3	110
	Mansfield	470	15.3	5.9	184
	New Bedford	3269	11.0	5.3	127
	North Attleborough	448	7.4	3.9	103
	Somerset	489	5.1	2.5	119
	Swansea	414	11.3	5.4	128
	Taunton	1270	13.7	5.9	156
Essex	Andover	957	10.9	3.9	207
	Beverly	1586	12.0	4.9	168
	Danvers	942	13.7	5.4	169
	Gloucester	1207	11.9	4.7	182
	Haverhill	1520	11.7	5.1	151
	Lawrence	2172	10.6	4.2	172
	Lynn	3745	12.4	5.0	175
	Lynnfield	543	11.1	4.1	202
	Marblehead	973	9.9	3.7	194
	Methuen	868	10.5	5.3	113
	Newburyport	470	10.2	4.8	133
	North Andover	408	10.5	4.5	154
	Peabody	1174	10.3	4.4	157
	Salem	1413	8.0	2.7	229
	Saugus	1024	14.2	6.7	131
	Swampscott	887	10.7	3.4	251
Franklin	Greenfield	842	11.3	4.5	176
	Montague	450	17.4	7.4	155

APPENDIX - TABLE III

County	District	Net Current Expense (thousands)	Required Levy Rate (in mills)	Full-Value Mandated Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Hampden	Agawam	928	15.0	6.2	164
	Chicopee	1736	11.6	6.4	94
	Holyoke	1671	8.5	3.3	183
	Longmeadow	822	13.0	4.2	239
	Ludow	454	12.4	6.3	112
	Palmer	343	11.3	5.7	112
	Springfield	8048	12.4	4.6	205
	Westfield	1075	12.7	5.9	134
	West Springfield	1394	11.1	4.0	205
Hampshire	Easthampton	367	9.4	4.6	120
	Northhampton	1059	11.8	4.7	173
	South Hadley	544	14.4	7.3	113
Middlesex	Arlington	2063	11.3	4.2	200
	Ashland	417	15.8	6.8	154
	Belmont	1442	8.4	2.7	248
	Billerica	758	13.6	7.6	93
	Cambridge	4086	9.6	2.7	303
	Chelmsford	590	12.4	6.5	103
	Concord	954	14.8	3.9	341
	Dracut	468	12.5	6.4	112
	Everett	2352	11.0	3.6	237
	Framingham	2162	12.0	4.3	196
	Lexington	1651	13.8	5.0	203
	Lowell	2501	11.3	5.1	141
	Malden	2648	13.7	5.1	200
	Marlborough	511	10.1	4.8	130
	Medford	2564	11.6	4.7	173
	Melrose	1596	13.2	5.0	191
	Natick	1750	12.1	5.0	165
	Newton	6274	12.1	3.4	302
	North Reading	394	15.0	7.5	118
	Reading	914	13.0	5.7	150
	Somerville	3568	16.0	5.9	208
	Stoneham	694	10.0	4.5	142
	Wakefield	1084	11.7	5.4	134
	Waltham	2187	9.9	4.0	172
	Watertown	1839	12.2	4.2	220
	Wayland	790	15.9	4.5	296
	Weston	705	12.6	3.5	297
	Wilmington	624	15.5	7.6	122
	Winchester	1336	12.7	4.0	253
	Woburn	1130	12.0	6.0	117
	Tewksbury	595	14.0	8.0	88

APPENDIX - TABLE III

County	District	Net Current Expense (thousands)	Required Levy Rate (in mills)	Full-Value Mandated Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Norfolk	Braintree	1996	14.8	5.8	181
	Brookline	3095	10.7	2.5	389
	Canton	491	10.2	4.4	156
	Dedham	1082	9.7	3.9	171
	Foxborough	480	15.0	6.0	174
	Franklin	409	14.7	6.4	155
	Holbrook	422	12.5	6.4	111
	Milton	1225	9.0	3.1	226
	Needham	1750	10.8	3.4	254
	Norwood	1117	9.8	3.9	179
	Quincy	4628	12.0	4.1	224
	Randolph	792	13.2	6.8	112
	Sharon	676	15.9	6.5	172
	Stoughton	689	13.6	6.9	113
	Walpole	954	14.7	4.8	241
	Wellesley	1922	10.7	3.0	295
	Westwood	767	12.3	3.7	271
	Weymouth	2557	12.3	5.3	156
Plymouth	Abington	626	17.5	6.9	179
	Bridgewater	360	14.5	8.0	96
	Brockton	2563	9.8	4.9	117
	Hingham	1029	15.1	5.7	191
	Hull	561	10.8	3.8	223
	Middleborough	480	12.6	6.3	116
	Plymouth	697	7.6	3.1	170
	Rockland	501	11.2	5.8	110
	Scituate	729	10.7	4.2	182
	Wareham	499	8.4	3.5	163
	Whitman	435	14.0	7.0	117
Suffolk	Boston	26564	11.9	4.3	215
	Chelsea	1300	16.3	7.0	161
	Revere	1875	15.5	6.2	178
	Winthrop	893	15.3	5.6	206
Worcester	Auburn	738	17.0	7.8	137
	Fitchburg	1290	8.4	3.3	180
	Gardner	561	10.4	4.5	149
	Grafton	391	13.2	6.4	123
	Holden	350	10.1	7.1	64
	Leominster	760	8.0	3.6	140
	Milford	498	9.0	4.6	112
	Millbury	401	14.5	6.8	129
	Northbridge	407	10.0	4.3	153
	Oxford	452	18.4	9.2	116
	Shrewsbury	838	14.2	5.2	182
	Southbridge	444	8.0	3.9	122
	Worcester	8106	13.7	5.3	190

APPENDIX - TABLE IV

Current Expense, Net Current Expense, Required Levy Rate, and Voluntary Expenditure Per Pupil in Selected New Hampshire School Districts,* 1958-59

County	District	Current Expense (thousands)	Net Current Expense (thousands)	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Balnap	Laconia	708	705	11.1	0
Cheshire	Keene	1,322	1,313	16.2	51
Coos	Berlin	489	473	6.0	0
Grafton	Lebanon	495	468	15.3	21
Hillsboro	Manchester	2,566	2,563	9.5	0
	Nashua	1,567	1,561	13.0	0
Merrimack	Concord	1,351	1,351	15.3	26
Rockingham	Portsmouth	1,510	1,504	13.9	0
	Salem	421	372	13.8	0
Strafford	Dover	776	686	10.8	0
	Rochester	568	550	10.4	0
Sullivan	Claremont	678	666	14.9	17

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* A full value mandated tax levy of 14 mills was imposed upon all taxable property in 1958-59. The Voluntary Levy Rate can be computed for a district by deducting this rate from the Required Levy Rate.

APPENDIX - TABLE V

Net Current Expense, Required Levy Rate, and Voluntary Expenditure Per Pupil in Selected New Mexico School Districts,* 1958-59

County	District	Net Current Expense (thousands)	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Bernalillo	Albuquerque	0	0.0	$ 0
Chaves	Roswell	0	0.0	0
Colfax	Raton	57	1.5	30
Curry	Clovis	146	1.1	29
Dona Ana	Las Cruces	125	0.0	0
	Gadsden	15	0.1	6
Eddy	Carlsbad	121	0.5	16
	Artesia	88	0.4	22
Grant	Cobre	17	0.2	7
Lea	Lovington	117	0.7	39
	Hobbs	186	0.9	28
Los Alamos	Los Alamos	98	2.9	29
Luna	Deming	83	0.2	34
McKinley	Gallup	0	0.0	0
Otero	Alamagordo	93	0.8	16
Quay	Tucumcari	46	0.9	21
Rio Arriba	Espanola	15	0.9	9
Roosevelt	Portales	20	0.4	8
San Juan	Aztec	6	0.1	3
	Farmington	7	0.0	1
	Kirtland Central	3	0.1	2
San Miguel	Las Vegas Town	27	3.2	18
	Las Vegas City	0	0.0	0
Santa Fe	Santa Fe	0	0.0	0
Socorro	Socorro	0	0.0	0
Taos	Taos	0	0.0	0
Valencia	Belen	26	0.9	10
	Grants	126	1.0	30

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* Inasmuch as there is no mandated local levy rate, the Required and Voluntary Levy Rates are the same.

APPENDIX - TABLE VI

Net Current Expense, Resident ADA, Required Levy Rate, and Voluntary Expenditure Per Pupil in Selected New York School Districts,* 1958-59

County	District	Net Current Expense (thousands)	Resident ADA	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Albany	Albany	3,436	12,239	7.2	10
	Bethlehem	1,574	3,127	13.6	232
	Cohoes	430	1,770	10.4	72
	Guilderland	442	3,302	8.2	13
	Ravena Coeymans	688	1,741	19.2	244
	South Colonie	477	5,241	5.6	0
Allegany	Wellsville	283	2,107	7.2	0
Broome	Alice F. Palmer	93	1,598	6.7	0
	Binghamton	1,960	11,886	8.1	15
	Chenango Valley	463	3,045	11.3	53
	Endicott	1,256	5,242	11.0	82
	Johnson City	625	3,171	9.7	48
	Maine Endwell	448	3,455	11.6	37
	Vestal	460	4,254	9.4	23
Cattaraugus	Gowanda	133	1,802	4.6	0
	Olean	901	3,776	12.4	98
	Salamanca	130	1,678	5.3	0
Cayuga	Auburn	595	4,539	4.6	0
Chautauqua	Dunkirk	967	2,892	9.9	150
	Falconer	115	1,647	4.0	0
	Jamestown	379	7,361	2.7	0
	Southwestern	142	2,302	4.5	0
Chemung	Elmira	1,228	10,743	5.9	0
	Elmira Heights	174	1,882	5.4	0
	Horseheads	208	4,122	3.9	0
Chenango	Norwich	337	2,449	9.3	43
Clinton	Plattsburgh	341	2,147	7.9	12
Columbia	Chatham	121	1,531	5.5	0
	Hudson	252	1,614	9.4	34
	Ichabod Crane	44	1,515	2.0	0
Cortland	Cortland	614	3,075	10.2	57
	Homer	61	1,997	2.8	0
Delaware	Sidney	10	1,975	.5	0
	Walton	43	1,483	2.6	0
Dutchess	Arlington	566	3,475	6.6	0
	Beacon	427	1,666	10.3	74
	Hyde Park	542	2,736	10.9	64
	Poughkeepsie	1,499	4,850	10.9	102
	Wappingers Falls	642	3,934	7.8	9

APPENDIX - TABLE VI

County	District	Net Current Expense (thousands)	Resident ADA	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Erie	Akron	154	1,557	7.9	7
	Buffalo	15,909	61,242	8.9	46
	Charlotte Sidway	269	2,047	7.7	7
	Cheektowaga	482	1,752	6.8	0
	Clarence	429	2,759	8.1	15
	Cleveland Hill	570	3,107	11.7	53
	Depew	409	1,595	13.3	115
	East Aurora	810	2,478	15.6	173
	Eden	193	1,680	7.8	7
	Frontier	504	4,607	4.4	0
	Griffith Institute	270	2,048	8.6	20
	Hamburg	668	3,187	10.0	55
	Iroquois	47	2,090	1.5	0
	Kenmore	4,703	16,962	9.4	60
	Lackawanna	1,838	4,160	13.0	193
	Lake Shore	310	2,341	7.6	5
	Lancaster	785	3,448	10.1	62
	Orchard Park	534	3,191	8.6	25
	Sloan	376	2,043	9.8	47
	Tonawanda	684	3,608	10.3	54
	West Seneca	717	4,326	6.7	
	Williamsville	920	3,615	9.2	52
Franklin	Malone	167	1,604	7.3	
Fulton	Gloversville	563	3,668	9.2	32
	Johnstown	254	1,969	10.3	37
Genessee	Batavia	899	3,046	11.4	105
Herkimer	Frankfort	80	1,598	3.2	
	Herkimer	196	1,853	7.3	
	Ilion	318	2,019	10.4	46
	Little Falls	279	1,653	8.7	26
Jefferson	Carthage	262	2,867	7.6	3
	Indian River	58	1,612	4.1	0
	Watertown	1,160	5,570	11.9	80
Lewis	Lowville	59	1,792	3.4	
Livingston	Dansville	68	1,785	2.9	
Madison	Canastota	98	1,895	5.0	
	Cazenovia	117	1,748	5.4	
	Chittenango	154	1,926	8.0	7
	Oneida	262	2,670	7.2	
Monroe	Brighton	1,179	3,047	12.1	153
	Brockport	261	1,516	10.2	48
	East Rochester	537	1,604	15.5	176
	Fairport	200	2,140	5.8	
	Hilton	124	1,858	4.8	
	Irondequoit	955	4,545	8.3	25

APPENDIX - TABLE VI

County	District	Net Current Expense (thousands)	Resident ADA	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Monroe	Penfield	1,664	2,736	29.2	455
	Pittsford	593	1,924	9.1	61
	Rochester	11,598	36,933	9.5	71
	Rush Henrietta	450	2,787	8.5	22
	Spencerport	224	1,685	8.6	19
	Webster	441	3,568	6.7	
Montgomery	Amsterdam	965	3,981	11.5	174
Nassau	Baldwin	2,105	5,934	17.6	207
	Carle Place	663	2,447	14.8	177
	East Meadow	1,454	15,046	7.8	6
	East Rockaway	477	1,527	13.9	147
	Farmingdale	2,625	7,708	17.6	199
	Freeport	1,869	5,226	13.1	155
	Garden City	2,239	3,929	12.0	220
	Glen Cove	1,415	3,649	13.3	173
	Great Neck	7,504	8,938	22.0	598
	Hempstead	1,955	3,857	10.7	158
	Hicksville	2,463	10,889	14.1	108
	Lawrence	2,821	5,164	14.6	271
	Levittown	2,879	15,083	17.9	113
	Herricks	1,110	3,970	11.8	104
	Long Beach	2,526	4,227	14.5	295
	Lynbrook	1,386	3,067	14.3	220
	Malverne	976	2,784	14.4	172
	Manhasset	2,270	2,413	17.5	547
	Massapequa	1,981	11,257	11.4	63
	Mineola	1,723	3,890	27.5	556
	Oceanside	1,973	7,382	13.8	125
	Plain Edge	1,371	6,212	19.4	137
	Port Washington	2,343	4,430	15.5	279
	Rockville Center	2,300	3,916	17.5	341
	Roslyn	2,190	3,432	20.9	414
	Sea Cliff	1,517	2,611	9.7	140
	Syosset	1,548	5,612	11.5	654
	Wantagh	297	3,745	4.3	
	West Hempstead	1,414	3,378	18.1	249
	Westbury	1,402	3,546	14.7	199
	Woodmere	2,164	3,802	17.8	335
	New York City	292,686	846,283	11.6	9
Niagara	Lewiston Porter	372	3,325	6.8	
	Lockport	1,199	5,023	11.2	82
	Newfane	194	2,086	8.4	
	Niagara Falls	4,652	17,548	11.1	11
	North Tonawanda	1,258	6,040	11.2	72
	Royalton Hartland	241	1,669	10.4	
	Star Point	40	1,598	2.4	
	Wilson	105	1,747	5.3	

APPENDIX - TABLE VI

County	District	Net Current Expense (thousands)	Resident ADA	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Oneida	Clinton	229	1,678	10.7	43
	Holland Patent	55	1,565	3.0	
	New Hartford	333	2,874	6.7	
	Rome	1,109	8,737	8.5	18
	Sherrill	273	2,639	8.0	9
	Utica	2,681	13,709	10.2	55
	Whitesboro	431	3,700	9.2	24
Onondaga	Baldwinsville	221	3,502	6.0	
	Dewitt	383	2,084	7.9	12
	East Syracuse	342	1,385	14.4	121
	Liverpool	841	3,693	11.4	82
	Manlius	451	2,831	9.8	68
	Marcellus	39	1,688	2.0	
	Skaneateles	219	1,723	6.1	
	Solvay	754	2,079	12.4	148
	Syracuse	7,315	26,993	9.8	67
	West Genesee	289	4,371	5.4	
Ontario	Canandaigua	260	2,438	5.6	
	Geneva	518	2,763	13.7	137
Orange	Cornwall	242	1,466	6.4	
	Middletown	450	3,257	7.5	2
	Monroe Woodbury	454	1,707	9.7	65
	MontWalden Maybrk	352	2,804	8.9	22
	Newburgh	999	4,579	10.7	68
	Port Jervis	142	2,092	3.9	
Orleans	Albion	149	2,099	4.6	
	Medina	198	2,187	6.2	
Oswego	Central Square	000	2,569		
	Fulton	713	2,670	16.4	148
	Mexico	000	1,758		
	Oswego	914	3,150	9.3	62
	Phoenix	31	1,975	.2	
Otsego	Oneonta	472	2,623	9.2	37
Rensselaer	Averill Park	208	1,861	8.6	16
	East Greenbush	485	3,173	9.8	38
	Lansingburg	234	1,696	8.3	15
	Troy	1,354	4,619	11.5	106
Rockland	Haverstraw	926	2,984	12.7	130
	New City	939	3,267	13.9	138
	Nyack	679	3,244	15.2	108
	Pearl River	558	1,827	14.4	150
	South Orangetown	820	2,025	16.8	228
	Spring Valley	1,092	3,889	14.6	142
	Suffern	726	2,247	13.9	152

APPENDIX - TABLE VI

County	District	Net Current Expense (thousands)	Resident ADA	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
St. Lawrence	Canton	114	1,594	7.0	
	Gouverneur	303	2,561	10.6	36
	Massena	722	4,643	8.4	20
	Norwood Norfolk	000	1,815		
	Odgenburg	316	2,176	11.6	7
	Potsdam	108	1,875		
Saratoga	Ballston Spa	000	1,978		
	Burnt Hls Ballston	306	3,195	8.5	13
	Mechanicville	298	1,807	9.7	40
	Saratoga Springs	518	2,261	12.7	96
	Shenendehowa	000	1,812		
	South Glens Falls	345	1,828	10.7	60
Schenectady	Niskayuna	1,296	3,009	14.4	211
	Schalmont	762	1,693	11.6	164
	Schenectady	4,496	11,777	13.8	179
	Scotia Glenville	749	3,251	13.3	103
Schoharie	Cobleskill	182	1,675	8.2	12
Schuyler	Watkins Glen	30	1,608	1.3	
Seneca	Seneca Falls	221	1,711	7.2	
	Waterloo	98	1,876	4.4	
Steuben	Bath	4	2,070	.2	
	Corning	1,295	7,339	9.2	35
	Hornell	431	3,012	10.9	45
Suffolk	Amityville	1,141	3,174	18.2	215
	Bay Shore	1,941	3,677	17.6	307
	Bayfort Blue Point	297	1,601	10.7	58
	Bellport	498	2,361	14.6	105
	Brentwood	785	5,378	11.1	50
	Central Islip	3,603	2,838	10.3	37
	East Islip	559	2,178	13.7	119
	Half Hollow Hills	696	2,119	13.6	151
	Huntington	2,296	5,001	9.3	55
	Islip	000	1,706		
	Lindenhurst	1,138	6,052	12.8	80
	Northport	1,778	4,239	17.0	241
	Patchogue	1,140	3,881	16.7	165
	Port Jefferson	82	579	2.9	
	Riverhead	669	2,760	7.2	
	Sachem	547	2,748	12.4	82
	Sayville	533	1,961	13.4	123
	Smithtown Branch	811	2,948	12.5	114
	South Huntington	1,440	5,605	14.5	127
	West Babylon	802	4,087	12.8	84
	West Islip	761	4,557	11.8	63
Sullivan	Monticello	491	2,018	5.6	

APPENDIX - TABLE VI

County	District	Net Current Expense (thousands)	Resident ADA	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Tioga	Owego	109	2,581	3.0	
	Waverly	184	1,909	6.9	
Tompkins	Ithaca	1,117	6,453	8.1	15
Ulster	Ellenville	640	1,804	8.9	61
	Kingston	1,750	4,045	9.9	
	Onteora	533	1,676	6.9	
	Saugerties	289	2,125	6.9	
Warren	Glen Falls	966	2,807	13.6	112
Washington	Hudson Falls	265	2,387	8.3	13
Wayne	Newark	331	2,173	6.8	
	Palmyra Macedon	184	1,746	7.1	
	Wayne	22	1,634	1.4	
Westchester	Ardsley	766	1,840	18.6	252
	Chappaqua	1,130	2,046	18.1	328
	Eastchester	1,173	2,592	13.3	203
	Harrison	1,089	2,016	15.2	279
	Hastings On Hudson	667	1,523	16.7	243
	Hendrick Hudson	591	1,579	14.5	185
	Mamoroneck	2,034	4,277	11.8	181
	Mount Kisco	1,487	2,389	14.4	305
	Mount Vernon	3,587	10,493	14.2	165
	New Rochelle	3,439	10,116	9.5	78
	Ossining	1,505	3,340	17.1	257
	Peekskil	883	2,609	15.4	177
	Pelham	1,183	2,227	13.6	244
	Pleasantville	382	1,377	11.1	95
	Port Chester	1,340	4,302	14.0	148
	Rye	1,086	2,027	13.0	231
	Scarsdale	2,354	3,384	17.0	395
	Tarrytown	1,279	2,443	16.0	316
	White Plains	3,525	7,238	11.1	165
	Yonkers	5,780	22,593	8.3	28
	Yorktown Heights	713	2,054	16.5	2
Yates	Penn Yan	460	2,424	7.4	1

APPENDIX - TABLE VII

Net Current Expense, Required Levy Rate,
and Voluntary Expenditure Per Pupil in
Selected Oregon School Districts,* 1958-59

County	District	Net Current Expense (thousands)	Required Levy Rate (in mills)	Voluntary Expenditure Per Pupil
Baker	Baker	451	7.9	$ 55
Benton	Corvallis	1031	12.6	124
Clackamas	West Linn	607	14.1	195
	Lake Oswego	758	14.7	160
	Oregon City	754	14.8	140
Clatsop	Astoria	557	14.0	159
Columbia	St. Helens	484	8.5	86
Coos	Coquille	347	13.0	133
	Coos Bay	1191	11.5	124
	North Bend	602	17.8	231
Crook	County Unit	398	9.5	66
Deschutes	Bend	603	12.9	120
Douglas	Roseburg	1259	12.9	134
Hood River	County Unit	487	15.7	156
Jackson	Ashland	354	10.6	68
	Central Point	473	17.3	154
	Medford	2167	17.4	210
Josephine	County Unit	394	8.0	46
	Grants Pass	810	14.8	120
Klamath	County Unit	1175	8.1	62
Lane	Eugene	2724	11.2	109
	Springfield	1117	10.5	81
	Bethel	590	13.0	150
Lincoln	County Unit	1031	10.0	85
Malheur	Ontario	308	9.9	59
Marion	Salem	2951	11.1	100
Multnomah	Portland	17929	9.9	114
	Parkrose	852	13.8	145
	Reynolds	568	12.6	180
Polk	Dallas	315	16.7	129
Tillamook	Tillamook	466	11.0	106
Umatilla	Hermiston	400	21.4	158
	Pendleton	893	10.0	114
Union	La Grande	396	10.4	75
Wasco	The Dalles	468	10.5	85
Yamhill	McMinnville	390	12.4	102

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* A full value mandated tax levy of 5.9 mills was imposed upon all taxable property in 1958-59. The Voluntary Levy Rate can be computed for a district by deducting this rate from the Required Levy Rate.

APPENDIX B

This Appendix contains a brief explanation of the concept of multiple regression using dummy variables. The techniques described here were used in the statistical analysis reported in Chapter Four.

The technique of multiple regression is used to examine the relationship between a dependent variable y and several independent variables x_1, x_2, x_3. We assume that a linear relationship determines the value of the dependent variable when the values of the independent variables are given. $y = b_o + b_1 x_1 + b_2 x_2 + b_3 x_3 + e$. In this equation, e represents an unobservable random discrepancy, uncorrelated with the independent variables. For a sample of N observations of the observable variables y, x_1, x_2, x_3, we may obtain multiple regression estimates, $\hat{b}_o$, $\hat{b}_1$, b_2, and b_3 of the unknown parameters b_o, b_1, b_2, and b_3. These multiple regression $\hat{b}$'s may be useful in examining the "partial" effect of a single independent variable, that is, the effect on the dependent variable of a change in the value of the single independent variable holding the other independent variables constant. Thus an increase of one unit in x_1, holding x_2 and x_3 constant will produce a change of $\hat{b}_1$ (an increase if $\hat{b}_1$ is positive, a decrease if $\hat{b}_1$ is negative) in y. The $\hat{b}$'s can also be used to obtain an estimate of the value of the dependent variable for an observation for which only the independent variables are known. This could be either an actual or a hypothetical observation. Then with known or assumed values x_1^*, x_2^*, x_3^* and estimated regression coefficients $\hat{b}_o$, $\hat{b}_1$, $\hat{b}_2$, $\hat{b}_3$ we can calculate the expected value of the dependent variable $y^* = \hat{b}_o + \hat{b}_1 x_1^* + \hat{b}_2 x_2^* + \hat{b}_3 x_3^*$.

Sometimes we wish to divide our observations into categories and examine the effect on the expected value of the dependent variable of belonging to different categories for otherwise comparable observations. If there are two categories, we can add an independent variable x_4 to our model. This variable will take on the value 0 in observations belonging to the first category and 1 in observations belonging to the second category. Such a variable is called a "dummy variable." Its estimated coefficient $\hat{b}_4$ is the difference in the expected values of the dependent variable in two observations with identical values of x_1^*, x_2^*, x_3^*, but belonging to different categories. Then the expected value of the dependent variable is $y_1^* = \hat{b}_o + \hat{b}_1 x_1^* + \hat{b}_2 x_2^* + \hat{b}_3 x_3^* + \hat{b}_4 \cdot 0$ in the first category and $y_2^* = \hat{b}_o + \hat{b}_1 x_1^* + \hat{b}_2 x_2^* + \hat{b}_3 x_3^* + \hat{b}_4 \cdot 1$ in the second category. If we wish these hypothetical observations to be typical of our sample we can choose the assumed values of the independent variables equal to the sample means $x_1^* = \bar{x}_1$, $x_2^* = \bar{x}_2$, $x_3^* = \bar{x}_3$.

If we wish to divide our observations into three categories, we can use two dummy variables whose values are assigned as follows:

Category	Variable	
	x4	x5
1	0	0
2	1	0
3	0	1

The estimate $\hat{b}_4$ measures the difference in the expected value of the dependent variable for two otherwise identical observations belonging to categories 1 and 2 respectively. The estimate $\hat{b}_5$ does the same for categories 1 and 3. Thus a typical observation would have an expected value of the dependent variable of:

$$y_1^* = \hat{b}_o + \hat{b}_1\bar{x}_1 + \hat{b}_2\bar{x}_2 + \hat{b}_3\bar{x}_3 + \hat{b}_4 \cdot 0 + \hat{b}_5 \cdot 0 \text{ in category 1,}$$

$$y_2^* = \hat{b}_o + \hat{b}_1\bar{x}_1 + \hat{b}_2\bar{x}_2 + \hat{b}_3\bar{x}_3 + \hat{b}_4 \cdot 1 + \hat{b}_5 \cdot 0 \text{ in category 2, and}$$

$$y_3^* = \hat{b}_o + \hat{b}_1\bar{x}_1 + \hat{b}_2\bar{x}_2 + \hat{b}_3\bar{x}_3 + \hat{b}_4 \cdot 0 + \hat{b}_5 \cdot 1 \text{ in category 3.}$$

This method can easily be generalized to any number of categories by using one fewer dummy variable than the number of categories. In our regressions two sets of dummy variables were used. One dummy variable was used to divide our districts according to fiscal dependence or independence. We gave it the value 0 in fiscally dependent districts and 1 in fiscally independent districts. Nine dummy variables were used to identify the ten states of our study. Their values are shown in Table 9, p. 78.